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TRADE NAME	MODEL	FOLDER NO.
TELEVISION COURSE—INSTALLMENT No. 4		
Airline	74KR-1210A	4811-1
Approved Electronic Instrument Corp.	FM Tuner	4811-2
Bendix	110, 110W, 111, 111W, 112, 114, 115	4811-3
Brook	10C, 10D	4811-4
Clarion	12708	4811-5
Crescent	Record Changer E-1000	4811-25
Emerson	577B (Ch. 120012B)	4811-6
Firestone (Air Chief)	4-A-11 (Code No. 188-8-4A11)	4811-7
General Electric	102, 102W, 107, 107W, 114, 114W, 115, 115W	4811-8
Globe	454	4811-9
Magnavox	Chassis AMP-108A, AMP-108B	4811-10
Magnavox	Chassis CR-192A, CR-192B	4811-11
Magnavox	Chassis CR-207A, B, C, D	4811-12
Masco	IM-5	4811-13
Minerva	410, 411	4811-14
Molded Insulation	(Wiretone) MR-6	4811-15
National	NC-2-40DR, NC-2-40DT	4811-16
Philco	48-1274, 48-1276	4811-17
Philco	49-602	4811-18
Regal	1107	4811-19
Silvertone	8127 (Ch. 101.831A), 8128 (Ch. 101.831), Wire Recorder Amp. (Ch. 101.773)	4811-20
Sonora	100	4811-21
Stewart-Warner	C51T1 (Code No. 9054-A), C51T2 (Code No. 9054-B)	4811-22
Stromberg-Carlson	1101HPW	4811-23
Zenith	14H789 (Ch. 13D22)	4811-24

The PHOTOFACT Servicer

JUNE 15, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 5, No. 41

ROBERT M. ELLIS, *Editor*

TELEVISION INTERFERENCE

It has been considered by some that because of the broad-band acceptance characteristics of television receivers, interference from amateur transmitters is unavoidable; and the claim even has been made that amateur radio has been doomed by television. We are happy to learn that this gloomy outlook is not founded on fact.

That TVI (television interference) from radio transmitters can be successfully combatted is now evident from an article appearing in the May, 1948, issue of "QST," the organ of the American Radio Relay League. This article, captioned "TVI *Can* Be Reduced," by Philip S. Rand, W1DBM, appears on page 31.

It is not expected that service technicians will be afforded the opportunity of reworking radio transmitters—that would be illegal without the proper license anyway. However, should you encounter a case of television interference from an amateur transmitter, you will do the amateur a real favor by calling his attention to the matter—the chances are that he is unaware of the interference his rig is making. Call his attention to the QST article—he may not be aware of its existence. As a group you will find radio amateurs to be a swell bunch of fellows who want to enjoy their hobby; but not at the expense of the pleasure of others. As a rule, you will find the amateur will give you every cooperation.

It should not be inferred from the above that amateur radio constitutes the sole source of interference for television service, because this would be anything but true. Television is subject to interference from many sources, so it is not possible to assign responsibility for interference to an amateur just because his station is in the neighborhood. The interfering signal should be identified before accusations are made as to its source.

TV interference can be caused by industrial r. f. heating equipment; diathermy machines and similar equipment; as well as by transmitters and sparking electrical appliances. You will find the procedures listed in the QST article applicable for reducing interference arising from all kinds of radio frequency power generators.

★ ★

ADMIRAL SERVICE DATA "REMEDY FOR FOGGING DIALS"

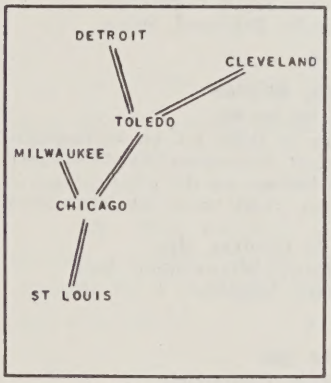
"The dial windows of the 8B1, 9A1 and 9B1 chassis build up a small electro-static charge, thus causing the plastic to attract fine dust particles. These are so fine that the dial windows appear milky or foggy. This often occurs within a few days.

"After considerable research, we found that a solution called Hexco Dust-Ded is an effective remedy. This solution is used on television magnifying lenses to reduce their affinity for dust. When testing this solution, we found it will materially reduce the amount of fine dust collecting on dial windows, thus preventing the foggy appearance. As far as we can determine, one application will last indefinitely. However, it is possible that reapplication may be necessary. At the present time we are treating all dial windows in production with this solution.

"To properly apply the solution, the dial window will have to be removed from the cabinet. Remove the knobs and the screws holding the escutcheon to the cabinet. Clean the window by wiping off the dust thoroughly on both sides, with a damp (not wet) cloth or chamois skin. Apply the Hexco Dust-Ded according to the directions on the bottle."

Reproduced from their Distributor Bulletin RAD-52 through the courtesy of Admiral who advise that Hexco Dust-Ded can be obtained from their distributors as Admiral Part No. 98A11-2.

MID-WEST VIDEO NETWORK TO BE OPERATING IN AUTUMN: EAST AND MID-WEST LINKS BY DECEMBER



OCTOBER, 1948

DECEMBER, 1948

"Over 2,000 miles of coaxial cable will connect stations in Buffalo, Cleveland, Toledo, Detroit, Chicago, Milwaukee and St. Louis in time for the football season, according to A. T. & T. In December, coaxial cable links between Philadelphia and Cleveland will be activated, thus providing east and mid-west with links for an exchange of service. By this time, too, the east coast coaxial cable will have been extended to Richmond, Va.

"It is expected that the westward extension of network facilities will keep pace with the inauguration of video service in the west and south, heralding a coast-to-coast television network within the next two or three years.

"Courtesy of Television Broadcasters Association, Inc."

Reprinted from "Electronic Markets," a small monthly booklet published by Electronics Magazine (McGraw-Hill) for management, sales and advertising men, whose interests lie in the future of the electronic industry.

IF TELEVISION HAS NOT AS YET REACHED YOUR COMMUNITY, IT WILL . . . AND PERHAPS MUCH SOONER THAN YOU THINK.

★ ★

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Company, Inc.

★ ★

UTAH 550 AUTOMATIC CHANGER

Photofact Set 8

"Complaint: Records would not play through, trips about half way in.

"Cause: The tone arm trip assembly, Item No. 26 in the PHOTOFACT Folder, was bent down engaging Part No. 24 spring release bracket instead of riding over and engaging the spring trip dog.

"Remedy: Bend No. 26 to clear release bracket."

Submitted by: Mr. Alvan D. O'Steen, Techni-Services, 407 Flamingo Drive, West Palm Beach, Fla.

UTAH 550 AUTOMATIC RECORD CHANGER
Photofact Set 8

"Raspy and muffled reproduction can be caused by the drive belt and drum drive wheel rubbing against the tone arm lead. The cure is to move the lead away from the wheel and to fasten it securely to the side of the cabinet."

Submitted by: Mr. John L. Berry, Kansas, Illinois

★ ★

GENERAL ELECTRIC 250 PORTABLE
Photofact 464-13, Set 4

"Complaint: Loud hum when the set is plugged into A.C. line.

"Cause: Rectifier ripple introduced through a poor battery connection.

"Remedy: Clean the male and female battery connection and spread male plug for good contact. Cover contacts with contact dope to prevent possible corrosion."

Submitted by: Mr. C. A. Sherman, Radio Department,
House-Sherman, Inc., 442 Main St., Rockland, Maine

★ ★

PHILCO 48-1262, 48-1282
Photofact 485-18, Set 35

"Complaint: Intermittent distortion on radio, o.k. on phonograph.

"The 220 mmf. i.f. coupling condenser, PHOTOFACT Item 26, shorted at times, causing the distortion. The leakage was not great enough to overcome the a.v.c. voltage at the grid, which made the defect more difficult to locate."

Submitted by: Mr. Thurman M. Gardner, Mgr.,
Radio Service Department, Midway Service Stores, Inc.,
1300 Monticello Avenue, Norfolk, Virginia

★ ★

MOTOROLA 26C

"Complaint: Mushy after 45 minutes of operation.

"I found it difficult to locate the cause of the trouble, since the set played properly when its cover was removed. Accordingly, I assumed that heat was the cause for this effect.

"Remedy: Using a 500-watt industrial infra-red light and a large cardboard with a small hole in it, I systematically heated one component at a time until I found the condenser causing the trouble. This method could be used on any set where heat seems to bring on the trouble."

★

ZENITH 6G501M

"Complaint: Set dead from 550-kc. to 700 k.c. on a.c. operation only; performance o.k. on battery.

"Remedy: Replace the 1LA6 converter, even though it checks o.k. on a tube checker. This has happened to me on several sets."

(Editor's note: the trouble can also be caused by a weak rectifier tube.)

Submitted by: Mr. Everett W. Clawson,
3780 Thornton Drive, Cincinnati 13, Ohio

★ ★

TEMPLE E-519
Photofact 462-3, Set 2

"The set was dead or intermittent after a brief warm-up, and noisy when tapped. I found the oscillator coil leads were not soldered to the terminals of the coil form. Soldering this did not correct the trouble. The difficulty was found in the ground lead to the oscillator coil which is riveted to the chassis. Tightening this rivet solved the problem."

★

EMERSON 547A
Photofact 4715-13, Set 25

"Complaint: Sudden fading and oscillation after warm-up.

"The trouble was found to lie in loose socket prongs on the 12BA6 socket; also the 12BA6 was found to be microphonic. Tightening the socket prongs and replacing the tube corrected the trouble."

★

PHILCO 46-200
Photofact 461-24, Set 1

"Complaint: Set faded after about twenty minutes of playing. The trouble was eliminated by moving the socket end of the .2 mfd. capacitor (PHOTOFACT Item 13) away from the tube socket. The lead was long, and shorted across the tube socket prongs, cutting out the primary of the oscillator coil and the a.v.c. circuits."

Submitted by: Mr. Wallace H. Tompkins,
Tompkins Radio Service, 128 Arch Street, Philadelphia 6, Pa.

★ ★

GENERAL ELECTRIC 60 CLOCK RADIO
Photofact 486-9, Set 36

"Low sensitivity and failure of the loop circuit to track was found to be caused by a shorted loop. This set has a very closely wound loop antenna of enameled wire. Small bits of solder apparently during manufacture had lodged between the grid winding and primary, burning the enamel off and shorting the winding. Brushing the loop with a very stiff hair brush effected a repair."

Submitted by: Mr. Orville V. Howell,
Howell's Radio Service, Box 463, Mars Hill, N. C.

★ ★

LOCATING MICROPHONIC TUBES

"Shops located in areas of high noise level often have difficulty in locating microphonic tubes and other circuit noises. I find it very helpful to apply a strong unmodulated signal to the antenna. This blocks out the local interference and makes the microphonic condition stand out like a sore thumb when tubes are tapped. This also applies to other noisy components of the set. The procedure is especially helpful in locating microphonic tubes in r.f. sections of portable receivers."

Submitted by: Mr. George L. Smith,
Smith's Radio Service, Tracy, Minnesota

★ ★

HIGH LINE VOLTAGE

"Quite a few of the older a.c,. sets were designed for a line voltage of 110 volts, which in some localities has now been raised to 121 volts or more. Since the high voltage secondary of the power transformer will be raised in the same proportion, the whole 'B' supply may be upset. This may cause arc-back in the rectifier tube, short life of the rectifier tube, due to increased 'B' current, or a breakdown of other components.

"Such a condition may be corrected by inserting a 10 watt wire wound resistor between the rectifier and the input of the filter. The value of this resistor should be such that the voltage at the input of the filter circuit is brought back to its original value."

Submitted by: Mr. C. W. Battels, Battels Radio-Electronics
Service, 559 Wooster Avenue, Akron 7, Ohio

★ ★

DETROLA 571 BX
Photofact 469-11, Set 9

"Complaint: Low volume, hum, deep bass output.

"Cause: Volume control—movable arm shorted to shaft.

"Remedy: Replace control."

★

DETROLA 568-14-221 E
Photofact 469-10, Set 9

"Complaint: Noisy while tuning—sounds like condenser plates rubbing.

"Cause: The case is of metal construction. If the tuning shaft rubs the sides of the holes it will cause noise.

"Remedy: For permanent remedy, recenter chassis and mount rubber grommets to fit shafts and holes."

Submitted by: Mr. R. M. DeVenuto, D. V.'s Radio Clinic,
301 E. Jefferson, Waxahachie, Texas

PUBLICATION DATES

When will other sets of PHOTOFACT Folders be published?

Volume 5—Set No. 42 ..... **July 15**
Volume 5—Set No. 43 ..... **Aug. 15**
Volume 5—Set No. 44 ..... **Aug. 15**
Volume 5—Set No. 45 ..... **Sept. 15**

If you have been unable to get any issues of PHOTOFACT *Folder Sets, send your order and money directly to us and we will see that you are supplied.*

FORMATION OF SQUARE AND SAWTOOTH WAVES: If a source of DC voltage connected to a resistive load is switched on and off in equal alternate periods, the applied electrical pressure across the resistor will take the form of a symmetrical square-wave of voltage - see Figure 47.

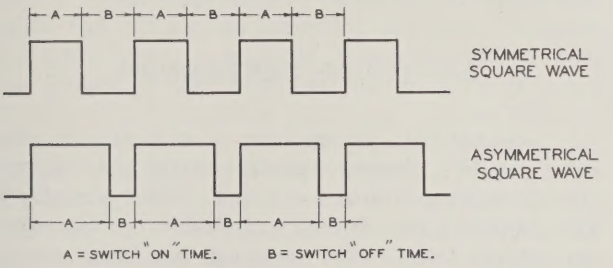


Fig. 47. Square Waveforms

On the other hand, if the circuit is switched on and off in unequal alternate periods, the applied voltage to the load would appear as an asymmetrical square-wave - see Figure 47. Therefore, by mechanically operating an on-and-off switch, we are able to generate two types of voltage wave forms. They are:

1. Symmetrical square-wave of voltage.

2. Asymmetrical square-wave of voltage.

Now, if a fairly large capacitor is connected in series with the resistor, and a DC source of supply is switched on and off in equal time periods to produce an applied square-wave of voltage, the resistive and capacitive components of the circuit will produce the following wave-shapes.

1. The capacitor voltage, known as the "integrator" voltage, will appear as a back-to-back sawtooth - see Figure 48.

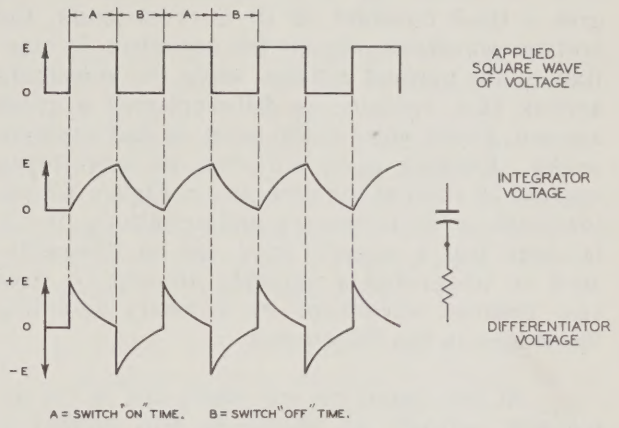


Fig. 48. Application of Square Wave of Voltage to R-C Circuits

2. The voltage drop across the resistor, known as the "differentiator" voltage, will appear as a partially distorted square-wave - see Figure 48.

NOTE: The polarity of the integrator voltage is unchanged during the charge and discharge period, while the differential voltage is driven in two directions: i. e., positive and negative.

By increasing or decreasing the value of the capacitor in the RC network, the integrator and differentiator voltage waveforms are changed, as shown in Figure 49.

Note that the output waveforms for the 100 microsecond circuit are similar to the ones shown in Figure 48. When the capacitor is increased in value to give a time constant of 1000 microseconds, only a slight voltage is obtained across the capacitor, while the voltage across the resistor is distorted very little from the applied waveform. On the other hand, when the value of the capacitor is reduced to

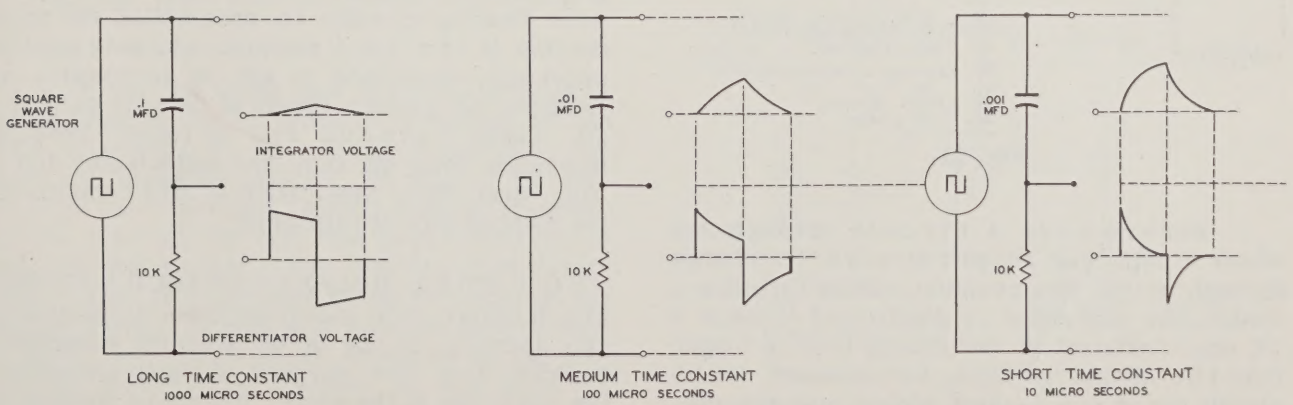


Fig. 49. Examples of Time Constants and their R-C Waveforms

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give a time constant of 10 microseconds, the voltage waveform across the capacitor is similar to the applied voltage, while the waveform across the resistor is differentiated a great amount, giving very sharp positive and negative peaks. Keeping in mind that the waveforms applied to each of the circuits in Figure 49 are identical as to frequency and amplitude, it can be seen that a square wave can be differentiated or integrated a variable amount to give the desired waveshape by properly selecting the values in the RC circuit.

At this point we are interested in the integrator voltage; so advancing still further in the study of wave-shapes and circuit analysis, refer to Figure 50.

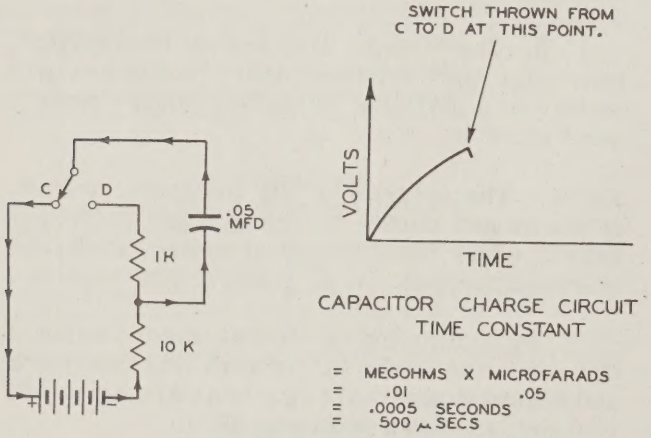


Fig. 50.

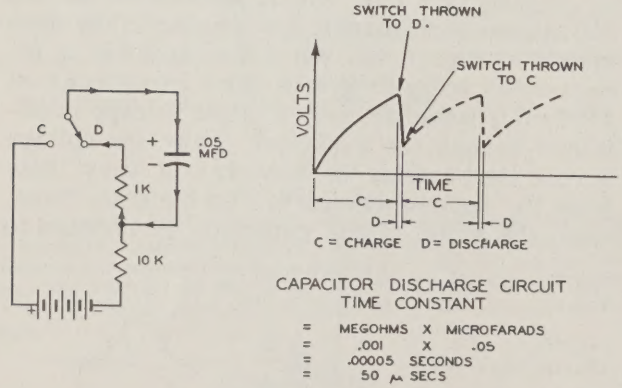


Fig. 51.

Here we have a circuit arrangement where a capacitor is permitted to charge through a 10K ohm resistor, and by throwing a switch the capacitor is discharged through a 1K ohm resistor. If the charge time is longer than the discharge time, for instance, let us say 10 times longer, the charge and the discharge voltage of the capacitor will take the form of a sawtooth of voltage - see Figure 51.

The slow charge and the rapid discharge effects can be clearly seen. To obtain linear horizontal and vertical scanning for building a frame or raster, it is necessary to generate and apply linear sawtooth waves to the deflection systems of the cathode-ray tube.

SAWTOOTH GENERATORS

Generally, production of a sawtooth wave involves the charge and discharge of a capacitor through resistors which differ greatly in size between the charge and discharge circuits. An introduction to this concept has been covered under the heading of R-C Circuits (pages 34 to 38). It has been shown that, to produce a sawtooth waveform, we need a simple circuit consisting of a source of voltage, a single pole-double throw switch, resistors and a capacitor. The capacitor is charged through a high value of series resistance. The voltage across the capacitor at any instant of time has been shown in Figure 43. It will be noted that the initial portion of this voltage-time curve is essentially a straight line. If we can short-circuit the capacitor before extreme curvature of the charge-time has occurred, and immediately initiate another charging cycle, we have produced a sawtooth wave. This sequence of events could be accomplished by the use of a mechanically operated switch. (See Figure 51.) Since this entire operation must occur in a few millionths of a second, it is obvious that the use of such a mechanically operated switch is impractical. For this reason we will resort to some of the properties of electron tubes to accomplish the switching sequence.

While modern television receivers employ vacuum tube oscillators and vacuum tube wave shaping circuits to accomplish the production of the ideal sawtooth scanning motion previously described, it will be instructive to examine the earlier forms of circuits employed. These methods are no longer used in television sets, but they are undoubtedly familiar since their application is still common in the cathode-ray oscilloscope.

NEON TUBE RELAXATION OSCILLATORS: The familiar neon gas-filled tube, employed in sign lighting, is one of the simplest automatic switches for the purpose of short-circuiting the capacitor at the proper instant to produce a sawtooth voltage wave. A gas-filled tube hav-

ing a pair of electrodes and connected to a source of electrical potential exhibits interesting properties as the voltage across the electrodes is gradually increased. No electrical current will flow through such a tube until the voltage reaches a value known as the "ionization potential". The tube, until this voltage has been reached, has acted as an open circuit or as an extremely high resistance. However, when the ionization potential has been reached, the pressure, or voltage, tears electrons from the atoms of the gas and leaves such stripped atoms with a positive potential. Under this set of conditions the free negative electrons are rapidly collected by the positive electrode, the positively charged atoms are correspondingly attracted to the negative electrode and current passes through the tube. The resistance of the tube suddenly changes and it can be considered as a voltage operated switch. Figure 52 shows the method of using such a gas-discharge valve as a switch across a capacitor.

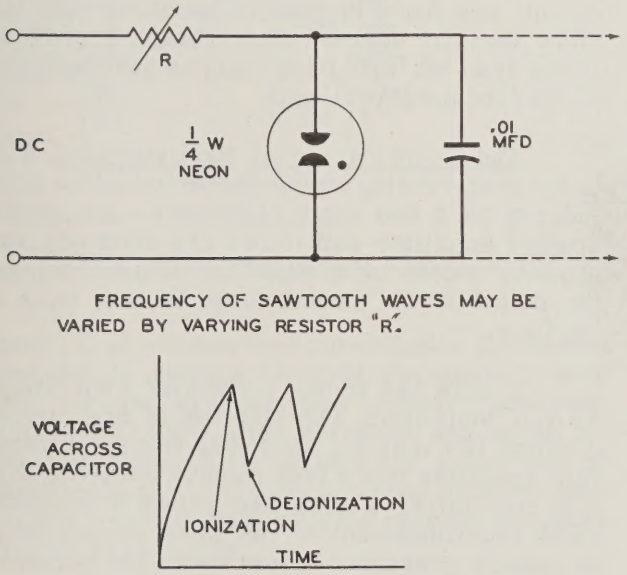


Fig. 52. Neon Tube Relaxation Oscillator

It will be seen that when the charge in the capacitor has produced a voltage across the tube equal to its ionization potential, the tube will suddenly conduct and start to discharge the capacitor. An interesting property of the tube, is the fact that once conduction of current has started it will continue even though the voltage has dropped below the original ignition point. Current will continue to flow until a lower level of voltage, known as the de-ionization potential, is reached. At this point the atoms of the gas regain their free electrons and the tube returns to its non-conducting condition.

The charging cycle from the voltage source through the series resistor is resumed and the cycle continues until ionization again occurs. This sequence of events is shown diagramatically in Figure 52. Such an automatically operated switching circuit is known as a relaxation oscillator because during the periods between its trip-over action the circuit is under normal (or relaxed) charging condition.

THYRATRON RELAXATION OSCILLATORS: The negative grid-controlled thyratron is an improved form of gas-discharge tube. Such a tube is essentially the same in action as the simple neon lamp previously described, with the following exceptions:

1. A source of electrons in the form of an electrically heated cathode, supplies the electrical current for the discharge portion of the cycle.

2. The trip-over, or triggering action, is under the control of an additional element similar to the grid of the familiar radio vacuum tube. This element is normally held at a negative potential and prevents current conduction between the cathode and plate, or anode, by its repelling action on the electrons emitted by the cathode.

3. The gas normally employed is not neon but preferably mercury or argon.

A relaxation oscillator can be built with this tube and its action is more easily controlled than that of a simple neon gas tube. Figure

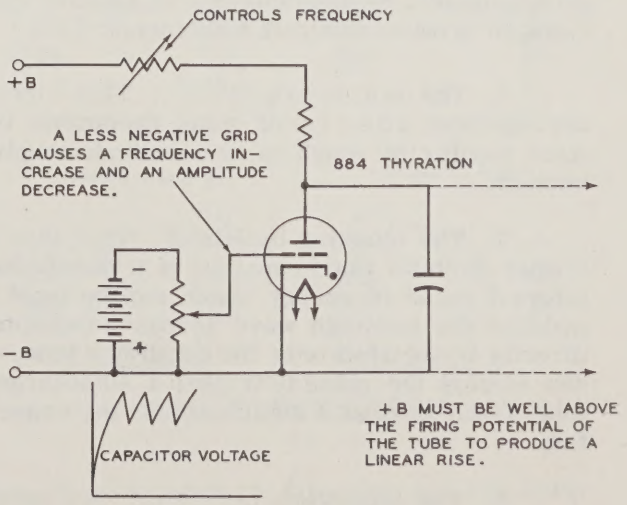

CONTROLS FREQUENCY
+B
A LESS NEGATIVE GRID CAUSES A FREQUENCY INCREASE AND AN AMPLITUDE DECREASE.
884 THYRATION
-B
CAPACITOR VOLTAGE
+B MUST BE WELL ABOVE THE FIRING POTENTIAL OF THE TUBE TO PRODUCE A LINEAR RISE.

Fig. 53. Thyratron Relaxation Oscillator

53 shows the basic circuit of a thyratron sawtooth generator. In order to assure that the rise of the charging potential is linear, only a small portion of the plate or "B" voltage is allowed to charge the capacitor. The grid is held at a sufficiently negative potential to insure that there is no plate current. In the diagram this grid potential is provided by a bias battery. Trip-over of the circuit can be produced by a positive pulse of voltage applied to the grid. Once initiated, plate current will flow until the plate voltage has dropped to a point which corresponds to the de-ionization potential as described in connection with the neon oscillator.

A circuit of this type is frequently employed in cathode-ray oscilloscopes and has also been used in pre-war television sets both in this country and abroad. Post-war receivers no longer employ gas tube relaxation oscillators due mainly to the fact that such oscillators are not sufficiently reliable in operation with fluctuating power line voltage, temperature and time.

VACUUM TUBE SAWTOOTH GENERATORS. We have seen that the requirements of a device to produce a sawtooth voltage waveform are basically those of applying a voltage to a capacitor through a series resistance and after the capacitor has reached a pre-determined charge, removing the voltage by a virtual short-circuit. This order of events can readily be accomplished by high vacuum type tubes rather than gas tubes.

In general, modern television sets have employed three distinct types of circuit arrangements, or combinations of these circuits, to produce sawtooth waveforms.

1. The multivibrator. This circuit arrangement admits of many variations, the most popular of which is the cathode-coupled version.

2. The blocking oscillator. This type of circuit permits the formation of a short-time interval pulse of energy which can be used to produce the sawtooth wave across a capacitor directly associated with the oscillator tube, or can employ the pulse to trigger a "discharge" tube which acts as a switch across the capacitor.

3. The sine-wave oscillator. An oscillator of the correct frequency supplies the timing voltage for the discharge tube and has sine-wave output modified to the form of short-time pulses by intermediate or wave-shaping circuits. These pulses are then used to operate a discharge tube to produce sawtooth waves.

THE MULTIVIBRATOR CIRCUIT. One of the most popular of television scanning generator circuits is the multivibrator. This is another form of relaxation oscillator which employs vacuum tubes, resistors and capacitors in a feedback arrangement.

The multivibrator derives its usefulness from the fact that tubes can be made to act as automatic switches to control the charge and discharge of capacitors. This produces a sustained output of rectangular wave form, the frequency of which can easily be controlled by the horizontal or vertical synchronizing pulses.

Several versions of the multivibrator circuit are found in modern television sets but since they are derived from a basic or conventional type we will first examine the operation of the fundamental circuit.

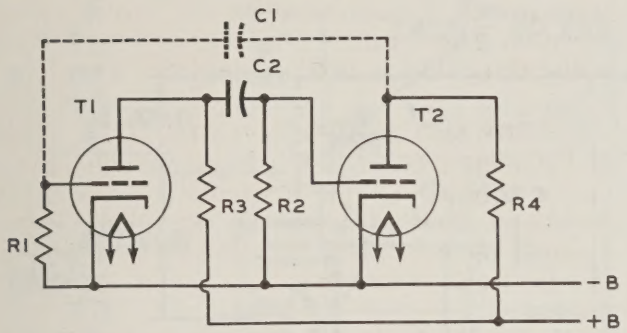
The Conventional Multivibrator. The basic free-running multivibrator might be considered as a two stage resistance-capacitance coupled amplifier with overall feedback applied by means of a capacitor connected from the output of the second stage to the input of the first.

Figure 54A shows a familiar two stage audio amplifier. The addition of one circuit element (C1 shown in dotted lines) converts this amplifier into a free running multivibrator type oscillator. Figure 54B shows a symmetrical rearrangement of the same circuit as it is usually presented in text books and receiver schematic diagrams.

Since, in a single stage resistance coupled amplifier, the phase of the plate voltage is inverted (180°) with respect to that of the input or grid voltage, it follows that the output voltage of the second stage (T2) of the two stage amplifier will have again been inverted and will be in phase with the input (T1) voltage. Capacitor C1 of Figure 54 will therefore impress upon the first grid, a voltage of the proper polarity to increase or augment the original input voltage and oscillation can take place.

To follow through the manner in which oscillation starts and is maintained in this cir-

(A) AS A TWO STAGE AMPLIFIER WITH CAPACITIVE OVERALL FEEDBACK.



(B) SAME CIRCUIT AS USUALLY DRAWN.

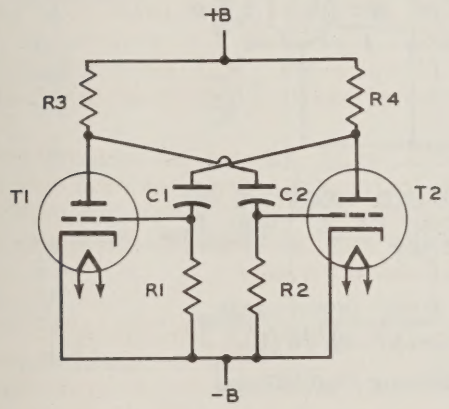


Fig. 54. The Conventional Multivibrator

cuit, let us assume that the cathodes are heated and that B+ voltage is suddenly applied. Both grid circuits are returned to their respective cathodes through grid resistors and at the instant of applying B+ voltage the grids will be substantially at cathode potential or zero bias. Grid current as well as plate current will start to flow in each tube.

It will be instructive at this point to list in numerical order with reference to Figures 54 through 57, the sequence of events which produces the sustained rectangular shaped output wave of the multivibrator.

1. Since the resistance of the internal cathode to grid path, under this initial condition of zero bias and high grid current, is much lower than the resistance of the grid resistors R1 and R2, the two capacitors C1 and C2 will begin charging from the B+ supply through resistors R4 and R3 respectively. This charging path is shown by the arrows of Figures 55A and 55C.

2. Now, if the characteristics of both tubes and the value of the circuit elements were exactly matched, the charging rate of both capacitors would be identical and plate current rise of both tubes would occur simultaneously. Under these conditions, a state of equilibrium would be reached and the circuit would not produce oscillation. Such a set of conditions is not met in practice and a balance is not established.

3. In the practical case, one of the tubes will start to conduct plate current sooner than the other. This could be due to a number of causes such as, lower plate resistance, hotter cathode or slightly lower plate load resistor. Let us assume that the plate current of T1 has started to rise a fraction of a second ahead of that of T2.

4. This rise of plate current will be accompanied by a drop in plate to cathode resistance and a corresponding drop in plate to cathode voltage. Figure 56A shows this set of operating conditions. The low plate resistance of T1 forms a discharge path for C2 as shown in Figure 55D.

5. The discharge current of C2, flowing through the high value of grid resistor R2, develops a high negative grid bias on the grid of T2. This drives the tube beyond plate current cut-off as shown in Figure 56B. The bias de-

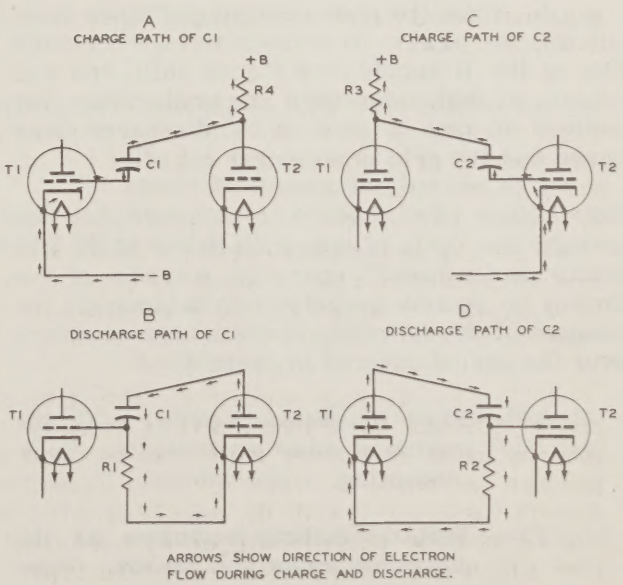


Fig. 55. Capacitor Charge and Discharge Paths in a Multivibrator

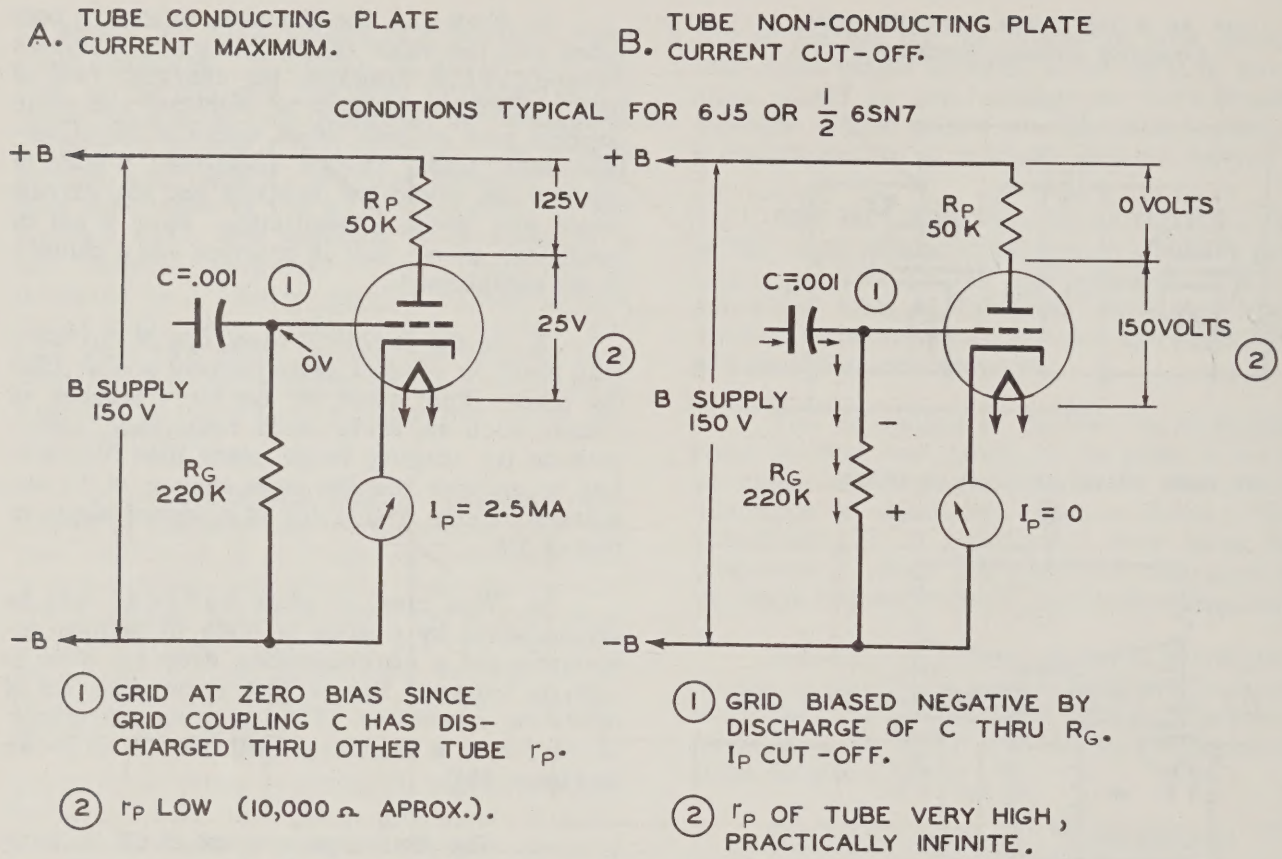


Fig. 56. Tube Operating Conditions in Multivibrator Oscillators

veloped by this discharge action may be as high as 30 to 50 volts in the example shown.

6. Since the plate current of T2 has been cut off, its plate to cathode voltage becomes that of the B supply (see Figure 56B), and will remain at that value until the grid voltage has arrived at such a point on the discharge-time curve that the grid is no longer cut off.

Note: Since the above set of conditions has brought the cycle of operation to one of the two stable or "relaxed" operating points of the circuit it would be helpful to summarize the changes of circuit voltages which have occurred over the period covered by steps 1 - 6.

T1 -- Plate to cathode voltage at its minimum value and steady. Tube conducting.

T2 -- Plate to cathode voltage at its maximum value and steady. Tube not conducting.

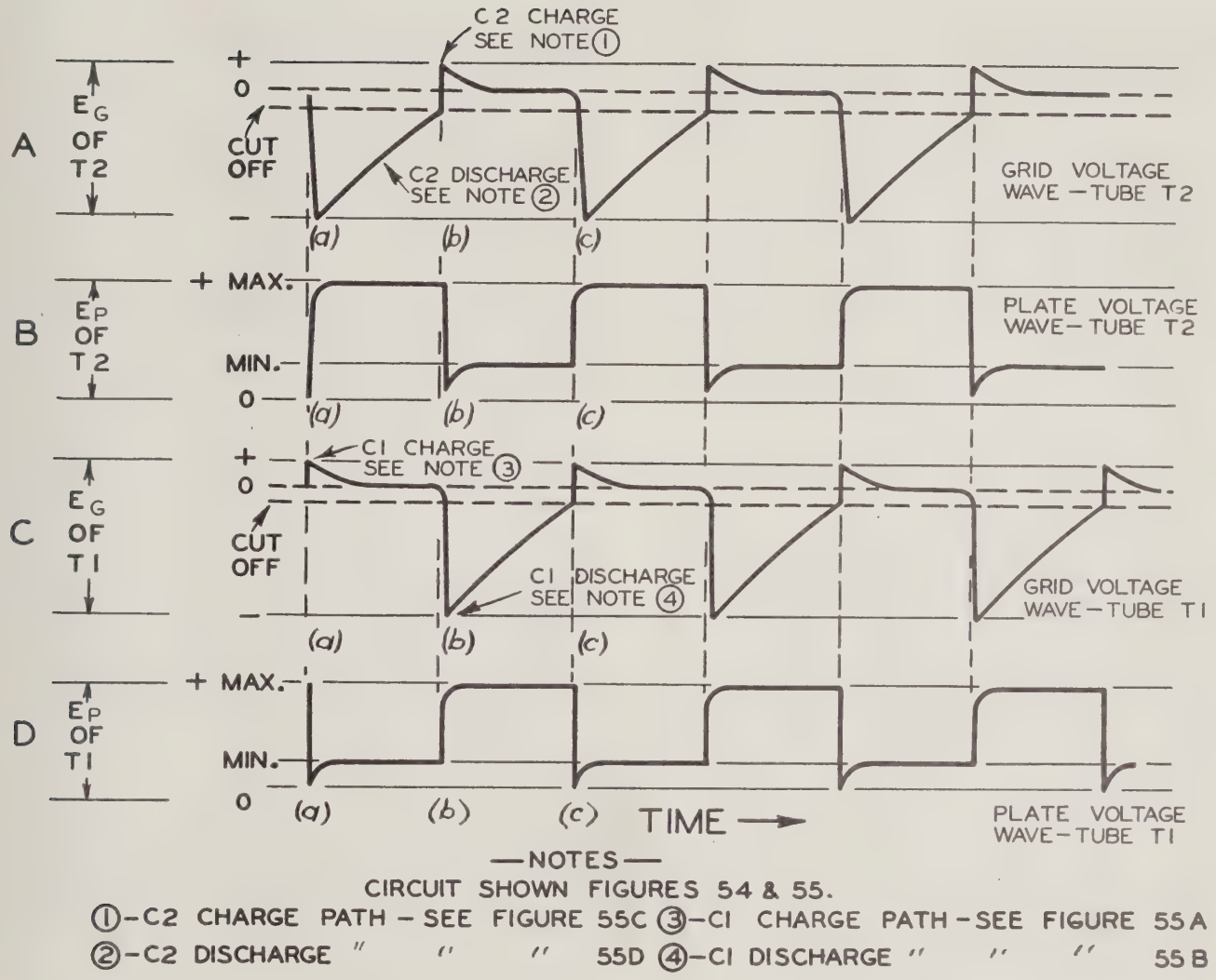
T1 -- Control grid voltage zero and steady.

T2 -- Control grid voltage highly negative but falling exponentially with time as C2 discharges through R2.

7. The time required for C2 to discharge will depend on the time constant of the discharge circuit which comprises C2, R2 and the plate resistance of tube T1. See Figure 55D. The negative voltage across R2, which constitutes the grid bias of T2, finally decreases to a value which will allow T2 to conduct heavily. Figure 57 shows the wave forms of the grid and plate voltages of both tubes as a function of time. The part of these waves between (a) and (b) in this figure cover the steps which have been outlined up to this point.

8. As T2 starts to conduct, conditions in this tube become identical to those described in step 4 for T1, except that the tubes and capacitors have exchanged functions, and the discharge path of capacitor C1 is now as shown in Figure 55B.

9. The discharge current of C1 flowing through R1 now biases T1 beyond cut-off as described in step 5.



—NOTES—

CIRCUIT SHOWN FIGURES 54 & 55.

①–C2 CHARGE PATH – SEE FIGURE 55C ③–C1 CHARGE PATH – SEE FIGURE 55A

②–C2 DISCHARGE " " " 55D ④–C1 DISCHARGE " " " 55B

Fig. 57. Typical Waveforms of a Symmetrical Multivibrator Showing Square Wave Switch Action

10. Since the plate current of T1 has been cut off, the plate to cathode voltage assumes the value of the B+ supply in similar fashion to T2 in step 6.

11. The rise in plate voltage of T1 is impressed on capacitor C2 starting a charging cycle as shown in Figure 55A.

12. Since the internal grid to cathode path of T2 is conductive due to the zero grid bias condition, the charging resistance is very small and C2 is charged very rapidly. This is shown at time (b) of Figure 57.

A new cycle has been started and we have arrived at a similar set of conditions to those described at the end of step 6.

We can now summarize the conditions of circuit voltage and compare them with those found at the end of step 6.

T1 -- Plate to cathode voltage at its maximum value and steady. Tube not conducting.

T2 -- Plate to cathode voltage at its minimum value and steady. Tube conconducting.

T1 -- Control grid voltage highly negative but falling exponentially with time as C1 discharges through R1.

T2 -- Control grid voltage zero and steady.

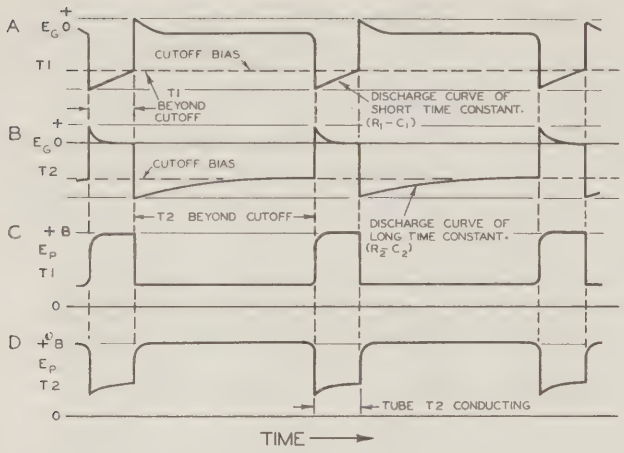


Fig. 58. Waveforms of an Asymmetrical or Unbalanced Multivibrator

It will be noted that the new set of conditions which represent the other stable or relaxed operating point is the same as before except that the tubes and grid circuits have changed places with one another. This cycle of events is shown in the waveform diagrams of Figure 57 between times (b) and (c). This generation of a square wave will continue at a frequency that is determined by the charge and discharge time constants of the coupling networks R1 - C1 and R2 - C2.

In this symmetrical circuit it has been assumed, but not previously stated, that the corresponding grid resistors, plate resistors and coupling capacitors are equal. When this is the case, the time constants are equal and the output wave shape from the plates is essentially identical. The frequency of this multivibrator can be changed by altering either the resistors R1 and R2 or the capacitors C1 and C2. A decrease in value of the time constant will increase the frequency. If the R values or the C values are changed equally the output wave will remain symmetrical.

The Asymmetrical or Unbalanced Multivibrator. In order to use the multivibrator to produce the type of sawtooth wave required for television scanning, it is necessary that succeeding square waves be unequal in length or spacing, and for this reason the time constant of the R-C circuit of one tube is deliberately made much greater than the time constant of the other. A multivibrator of this type is called asymmetrical. Figure 58 shows the waveforms obtained when the circuit constants of the symmetrical multivibrator just described, are changed in such a manner that the product (R1xC1) in the grid circuit of T1, is much smaller than the product (R2xC2) of T2.

Waveform D of Figure 58 shows a short time pulse of plate current occurring in tube T2 once each cycle, and it is this pulse which we will employ to produce the scanning sawtooth in proper time relationship to the scanning of the camera tube at the transmitter.

Use of the Multivibrator to Produce Sawtooth Scanning. Figure 59 shows a circuit similar to those which we have discussed under the headings of symmetrical multivibrators and also as an asymmetrical multivibrator. By the addition of two new circuit elements we can convert this arrangement into a method of generating sawtooth voltage waves for the control of the electron beam by either the horizontal or the vertical deflection plates of an electrostatic television picture tube. These new circuit elements are C3 and C4 (Figure 59). C3 is used as a coupling capacitor to connect the multivibrator circuit to a source of synchronizing pulses which are part of the transmitted television signal. The function of the synchronizing pulses and their action in the control of the frequency of the multivibrator will be covered in a later chapter.

At this time, the additional circuit element which concerns us, is the capacitor C4 connected between the plate and the cathode of T2. For horizontal line scanning frequency of 15,750 cycles per second, the circuit is so arranged that the time constant (R1xC1) is approximately 1/9th of the time constant (R2xC2). Under these conditions the plate current of T2 will consist of short pulses as shown in Figure 58. These pulses represent a condition of low resistance, and it is obvious

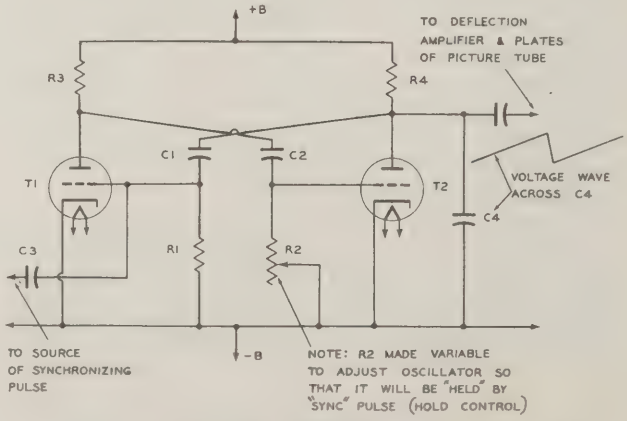


Fig. 59. Sawtooth Scanning Wave from Asymmetrical Multivibrator

that during the time shown as the "conducting period", tube T2 will act as a virtual short circuit across capacitor C4. In this manner the multivibrator is acting as a periodic switch and has fulfilled the requirements for the production of a sawtooth wave as covered in pages 37 and 38.

This type of controlled multivibrator has been used for both horizontal and vertical deflection scanning, in many of the lower priced electrostatically deflected television sets.

The voltage of the sawtooth wave across capacitor C4 (Figure 59) is of insufficient magnitude to produce the required deflection. Amplifiers are therefore needed, and usually take the form of push-pull circuits incorporating a phase inverter. Another significant difference between the circuit Figure 59 and Figure 54 is the fact that R2 has been made variable. This variable resistor is one of the major controls of a television receiver. From the previous discussion of multivibrator theory it is obvious that variation of R2 will alter the length of the portion of the operating cycle shown controlled by (R2-C2) in Figure 58. This represents the portion of the sawtooth wave which is active in scanning the face of the cathode ray picture tube during video modulation. Since this variable adjustment permits the multivibrator to be "locked-in" with the synchronizing pulse and "held" in step by that pulse, it has been known in engineering circles as a "hold" control. This nomenclature has been carried over into the trade and many modern television sets label this control knob as "horizontal hold" or as "vertical hold" depending upon the particular function concerned.

CATHODE-COUPLED MULTIVIBRATOR: An interesting variation of the multivibrator which is becoming practically a standard for inexpensive electrostatically deflected type television receivers is the cathode-coupled multivibrator or "Potter" circuit. This circuit is shown in Figure 60. A significant difference between this circuit and the conventional multivibrator is the fact that feedback is accomplished in two ways. The coupling capacitor C2 serves, as before, to transfer charges from the plate of T1 to the grid of T2. In addition, this circuit employs a cathode bias resistor which is common to T1 and T2. This common cathode resistor is responsible for the unique action and the name of the circuit. The second tube (T2) functions as a switch or discharge tube for capacitor C4 which produces the sawtooth waveform. From the theory of

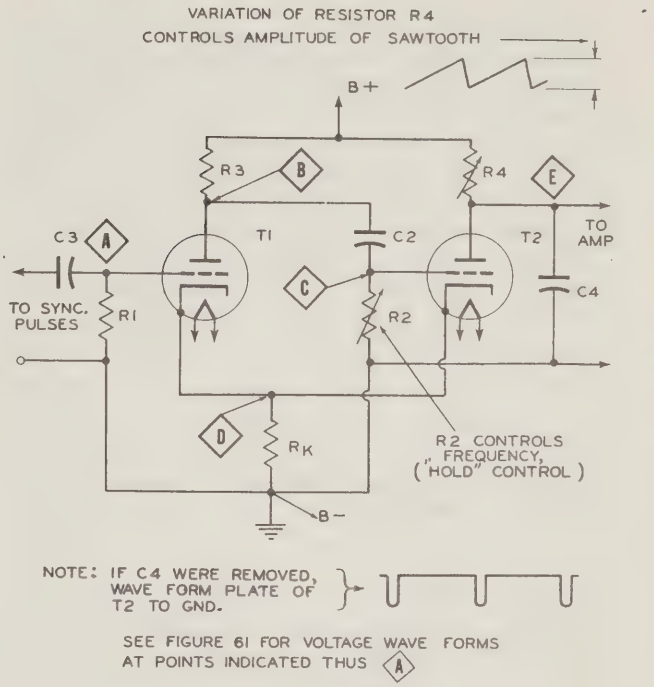


Fig. 60. Cathode-Coupled Multivibrator as Sawtooth Wave Generator

the conventional and asymmetrical multivibrators as previously discussed, the action of this cathode-coupled version can be readily understood. As before, we will assume that the cathodes of the tubes are heated and that B+ potential is suddenly applied. Let us again follow through in numerical order the sequence which allows this circuit to generate asymmetrical pulses.

1. Capacitor C2 will charge through the path consisting of R3 and the grid to ground or B- circuits of T2. This action will occur very rapidly since the grid of T2 is initially at zero potential.

2. Plate current will start to flow in both T1 and T2 causing a bias voltage for both of these tubes to be developed across the cathode resistor, Rk.

3. This bias voltage will immediately start to decrease the plate current of both tubes which were initially in a conductive condition since the control grids were at substantially zero potential.

4. The flow of plate current through T1 causes a lower plate to cathode voltage drop and a correspondingly lower plate resistance of this tube.

5. The low resistance path of T1 initiates the discharge of coupling capacitor C2 through R2. As in the conventional multivibrator previously discussed, this current flow through R2 produced a high negative bias on the control grid of T2 which immediately sweeps the tube to beyond its plate current cut-off point. It will be noted that this circuit differs from the conventional multivibrator in that there is no coupling capacitor between the plate of T2 and the grid of T1. For this reason, T2 is immediately thrown into a condition of plate current cut-off.

6. As in our discussion of the conventional multivibrator, it will be constructive at this time to summarize the voltage conditions which have occurred up to this point:

T1 - Plate to cathode voltage at its minimum value. Tube conducting.

T2 - Plate to cathode voltage rising along a portion of the charging curve which is substantially linear. This rise of plate voltage is charging capacitor C4 and initiating the first part of what will eventually become a sawtooth wave of voltage.

T1 - Control grid voltage negative and steady. The tube is self-biased by its own plate current flowing through the common cathode resistor Rk.

T2 - Control grid potential highly negative and exponentially dimishing in value.

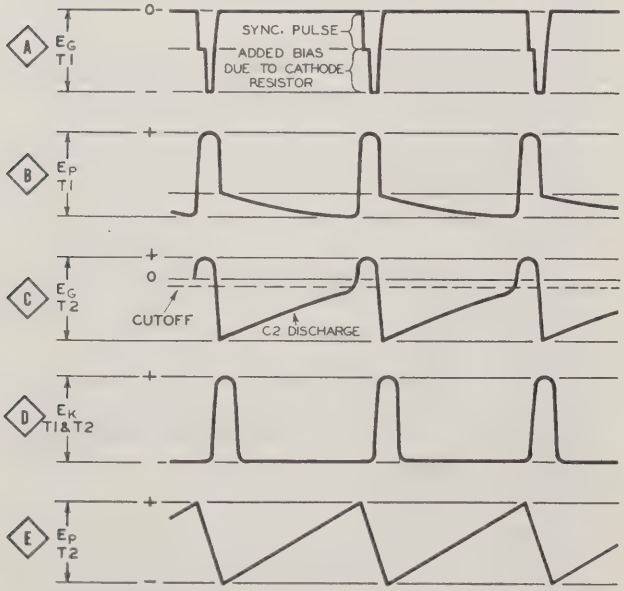


Fig. 61. Voltage Waveforms in Cathode-Coupled Multivibrator

7. T2 has been cut off during this period and no plate current has been flowing. C2 has been discharging through the path R2, Rk and the cathode to plate circuit of T1. It is interesting to note, that as the plate current of T2 was cut off by the high negative bias produced across R2 by the discharge of C2, the plate to cathode voltage did not immediately assume the value of the B+ supply since the plate voltage of this tube was maintained by the charge existing in C4, which started simultaneously with the closure of the B+ circuit. For this reason, the plate voltage wave of T2 instead of being rectangular form will be of sawtooth shape due to the charge flowing into C4 (if C4 is removed from the circuit then the plate to cathode voltage of T2 would rise immediately to the B+ value since the grid of this tube is cut off by the high negative voltage resulting from the discharge of C2).

8. As in the other types of multivibrators already discussed, when the bias of T2 falls to a value equal to the cut-off grid potential, T2 will start to conduct.

9. When conduction occurs in T2, C4 will be discharged rapidly through the plate to cathode circuit of this tube and its plate to cathode voltage will drop to its minimum value. See Figure 61. The sequence of events to this point has resulted in the production of a sawtooth wave of voltage across capacitor C4. Thus far, the action of the circuit has resembled that of the conventional and asymmetrical multivibrators previously discussed.

10. A significantly different action now takes place. The sudden pulse of plate current which occurs when T2 conducts, flows through cathode resistor Rk, and since this resistor is common to the cathode circuits of both T1 and T2, the voltage produced by this plate current pulse immediately drives the grid of T1 negative with respect to its own cathode.

11. This negative bias causes a sudden increase in the plate to cathode resistance and the plate to cathode drop of T1. The effect of the sudden increase of T1 plate voltage is to cause C2 to charge, thus instantaneously impressing a positive voltage on the grid of T2, momentarily increasing the value of the plate current pulse of T2 which started the cycle.

12. The cumulative increase of plate current flowing through common cathode resistor Rk finally produces sufficient negative bias on the grid of T1 to completely cut off the plate

current, and the plate to cathode voltage rises to its maximum value.

13. Capacitor C2 has become charged and the plate current of T2 "relaxes".

14. This decrease in current flow in Rk reduces the bias of T1. As T1 conducts, C2 is discharged through R2, Rk and the plate circuit of T1. This current flow in R2 drives the grid of T2 to cut-off and the cycle is repeated.

The fact that a sudden and cumulative action was produced in this circuit by the coupling of tubes T1 and T2 through a common cathode bias resistor, accounts for its designation as a cathode-coupled multivibrator. The reasons for the preference for this type in television design over the asymmetrical multivibrator previously discussed, are as follows:

1. It can be triggered and controlled by a negative pulse of voltage which often leads to simplification of control circuits.

2. Its sudden and cumulative pulsing action in tube T2 permits a higher ratio of linear sweep time to return time.

3. Simple variable resistors R2 and R4 of tube T2 (see Figure 60) permit control of both the frequency of scanning and its amplitude.

The wave shapes of the voltages at various points in this circuit, as a function of time, are shown in Figure 61. These wave shapes are identified by letters enclosed in 'diamonds' in Figure 60. In all cases voltages are measured to B- or ground.

THE BLOCKING OSCILLATOR. Another type of vacuum tube circuit for the production of controlled sawtooth voltage waves is known as the "blocking oscillator". The blocking oscillator is becoming increasingly popular in modern television sets as a means of producing either vertical or horizontal scanning. This popularity is due to the fact that its reliability of operation and ease of adjustment are dependent upon circuit elements such as transformers, resistors and capacitors rather than being dependent upon the characteristic of a vacuum tube which is employed in the circuit. Vacuum tubes are manufactured to rather wide commercial tolerance values and are subject to change of characteristics with age.

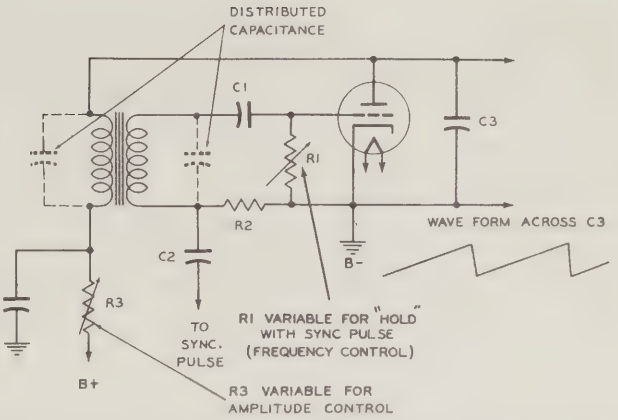


Fig. 62. Blocking Oscillator as a Sawtooth Generator

Figure 62 shows the blocking oscillator in its simplest form. It appears upon casual inspection to be a Hartley oscillator employing an iron core transformer. In essence it is such an oscillator, but instead of providing sustained sine wave oscillations it produces short time pulses of energy with correspondingly long intervals of relaxed action. For this reason, it is classified as another form of relaxation oscillator. Two significant differences distinguish this circuit from the common Hartley oscillator, namely:

a. The time constant of the grid resistor R1 and the grid capacitor C1 is such that long periods of blocked plate current occur between short periods of plate current conduction. During these short conductive periods oscillation takes place.

b. The natural period of oscillation of the transformer, with its associated distributed and lumped circuit capacitances, is such that the desired pulse time approximates one-half cycle of the frequency at which the circuit would oscillate if it were of the continuous sinusoidal type.

As in the case of the other types of sawtooth oscillators it will be instructive to follow through, in sequence, the various actions which take place in this circuit.

1. We will again assume that the cathode of the tube is heated and that the plate circuit is suddenly closed to provide B+ potential. Since the grid is initially at cathode or zero potential, plate current will start to flow through the primary of the transformer. This sudden rush of current will set up a magnetic field in the core of the transformer, inducing a

secondary voltage across the grid winding. The direction of these windings is such that the primary current will cause a positive potential to appear at the grid with respect to cathode or ground.

2. The positive voltage thus applied to the coupling capacitor C1 causes the grid to become more positive than the cathode. The grid then attracts electrons from the emitted cathode current, starting grid current through resistor R1.

3. Simultaneously, the increasingly positive grid potential causes the plate to draw still more current and the action is cumulative until plate current saturation is reached. As the plate current reaches a steady maximum value no further change of current occurs through the primary winding of the transformer.

4. Induction of voltage into the secondary depends upon the change of magnetic flux and therefore at this time the secondary voltage of the transformer ceases to rise.

5. As the grid tends to become less positive (C1 discharging through R1), the plate current through the primary begins to decay and the magnetic field linking the secondary coil starts to collapse. Note: The time taken for this sudden rise and decay of grid voltage is governed by the natural resonant frequency of the transformer with its associated circuit capacitances.

6. The collapsing field in the transformer due to the dropping plate current induces a secondary voltage which is in the opposite direction to the original plate current pulse. This causes C1 to discharge through resistor R1 which drives the grid more and more negative, hastening the decay of plate current and finally causing it to reach a cut-off point. While this action of reversal of grid voltage and cut-off of plate current has taken considerable time to describe, in reality it is practically instantaneous.

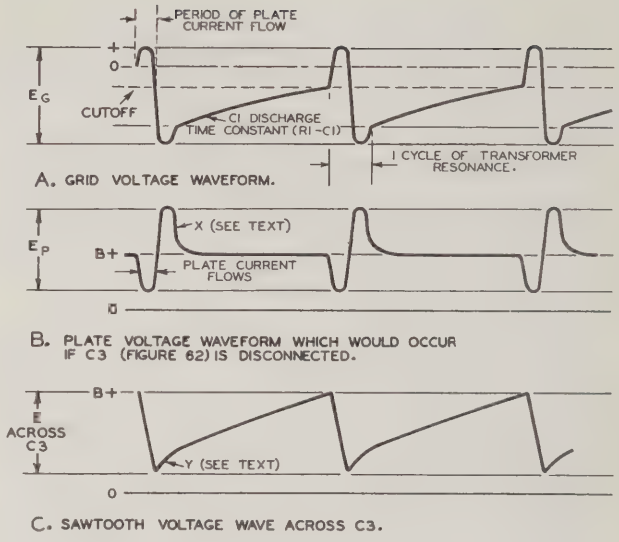


Fig. 63. Voltage Waveforms in Blocking Oscillator

7. From this point, action in the tube follows that described in the multivibrator and the grid potential follows an exponential curve of R-C discharge until the point of plate conduction is again reached.

8. The time taken for this discharge of C1 is dependent upon the time constant (R1+R2)xC1.

9. As the tube starts to conduct again, oscillation starts and the cycle is repeated. It will be seen from the curve of Figure 63 that the plate voltage of the tube is nearly steady and at its maximum value between the occurrence of these oscillatory pulses. It is evident that we have fulfilled the conditions of sawtooth charge and discharge of capacitor C3 in Figure 62 and have therefore produced a sawtooth scanning wave. As in previous circuits, the Grid resistor R1 can be made variable as a frequency control ("hold" control) and a plate circuit resistor made variable as a width or height control.

Installment No. 5 will continue the study of Sweep Generator Circuits and their application.

AIRLINE MODEL 74KR-1210A
BATTERY-LINE OPERATED

AIRLINE MODEL 74KR-1210A
BATTERY-LINE OPERATED

AIRLINE MODEL 74KR-1210A

TRADE NAME	Airline, Model 74KR-1210A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Three Power Operated Superheterodyne Receiver
TUBES (FOUR)	Types, 1A7GT Converter, 1N5GT IF Amp., 1H5GT Det.-AVC-AF, 3Q5GT Power Output.
POWER SUPPLY RATING	105-125 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form .17 Amp. @ 117 Volts AC or 45MA @ 9 Volts DC and 13MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to grid cap. of 1A7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation, transformer reduce dummy ant. to 200MMF. to reduce hum modulation.
2	200 MMFD	High side to ant. lead "A". Low side to B-.	1620KC	"	"	A5	Adjust for maximum output.
3	200 MMFD	"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output. Set pointer to 1400KC calibration mark.

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PARTS LIST AND DESCRIPTIONS

AIRLINE MODEL 74KR-1210A
BATTERY-LINE OPERATED

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1A7GT	1A7GT	7Z	
2	IF Amp.	1N5GT	1N5GT	5Y	
3	Det.-AVC-AF	1H5GT	1H5GT	5Z	
4	Power Output	3Q5GT	3Q5GT	7AP	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	40	150	25991	PRSA50502*	EZ443150*	DSB-305*		Filter-Red
B	40	150						" - "
C	40	25						Filament Bypass-Grn.
D	200	25		PRS25/100	BRH251	M-250-25		" " -Blue
6	.05	600	25996	484-05	DT6S5	ST-6-05	TC-15	Line Filter
7	.005	400	17646	484-005	DT6D5	ST-6-005	TC-25	Tone Compensation
8	.005	600	17646	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
9	.005	600	17646	684-005	DT6D5	ST-6-005	TC-25	" "
10	.1	400	17647	484-.1	DT4P1	ST-4-1	TC-1	Filament Bypass
11	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	IF Grid Filter
12	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	Conv. Screen Bypass
13	.05	200	8661	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
14	.1	400	17647	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
15	200	500	14370	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass
16	50	500	17091	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
17	10	500	25997	1468-00001	5W5Q1	MO.5-41	1FM-41	RF Coupling
18	100	500	8872	1468-0001	5W5T1	MO.5-31	1FM-31	Ext. Ant. Isolation

*Parallel sections to obtain desired capacity.

CONTROLS

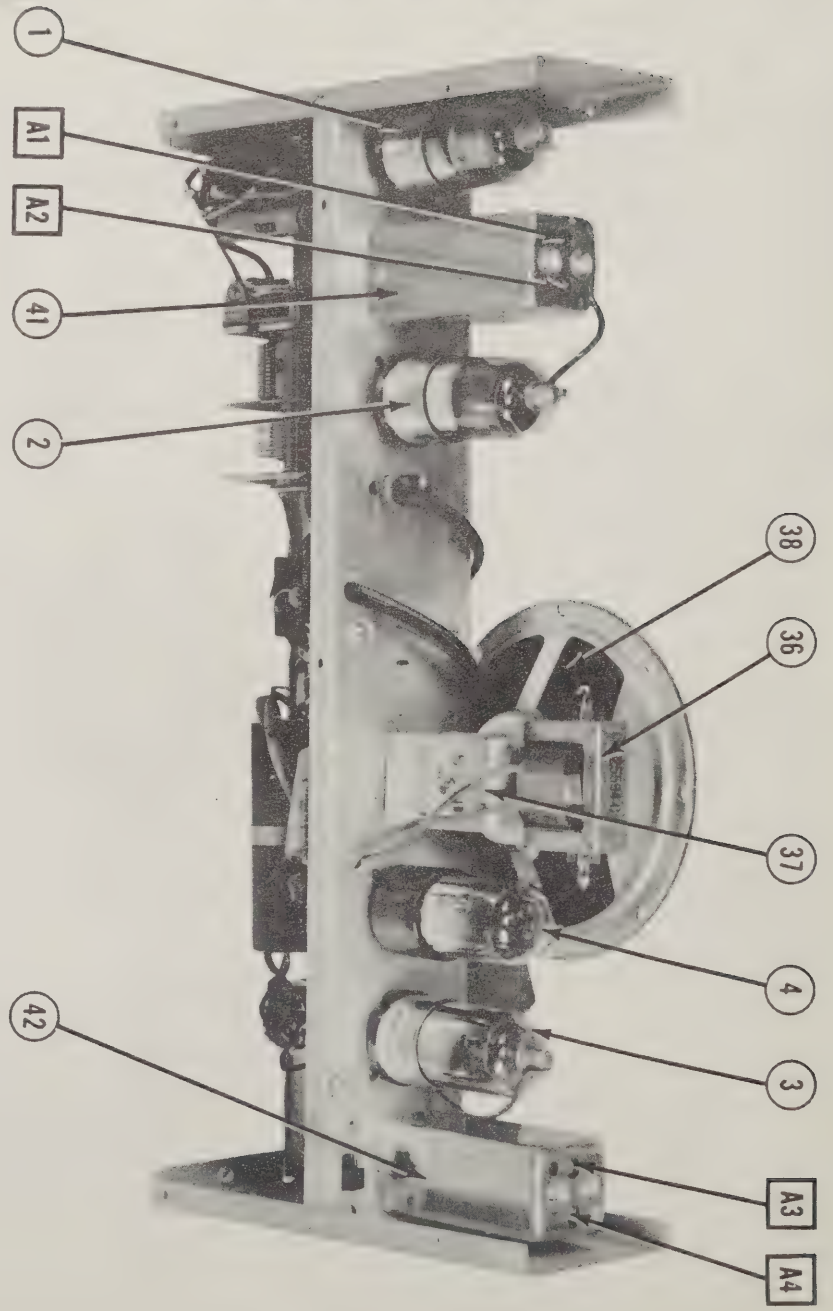
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
19A	500KΩ	½	25990	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 19A per instructions
C	Switch		" "	42	SW-A2	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	IDENTIFICATION CODES
20	150KΩ	½	14616	BTS-150K	Br.-Grn.-Yl. Osc. Grid
21	33KΩ	½	25144	BTS-33K	Or.-Or.-Or. Conv. Screen
22	15 Meg.	½	14365	BTS-15 Meg.	Br.-Grn.-Blue IF Grid
23	2.2 Meg.	½	25134	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
24	15 Meg.	½	14365	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
25	470KΩ	½	25042	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
26	2.2 Meg.	½	25134	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
27	15KΩ	½	17164	BTS-15K	Br.-Grn.-Or. Tone Comp.
28	470Ω	½	26003	BTS-470	Yl.-Vi.-Br. Fil. String
29	15Ω	½	26005	BW-½-15	Br.-Grn.-Blk. Series Filament
30	25Ω	½	26006		Rectifier Ballast-See Note 1
31	2950Ω	10	26008	ABA-3000	Fil. Dropping-See Note 2
32	2000Ω	1	26004	BTA-2200	Red-Blk.-Red Fil. Shunt
33	3300Ω	½	25385	BTS-3300	Or.-Or.-Red Filter
34	39Ω	½	26007	BW-½-39	Or.-White-Blk. Series Filament
35	220KΩ	½	25041	BTS-220K	Red-Red-Yl. Line Isolation

Note 1-Special ruse wire wound resistor. Do not use standard replacement.
Note 2-Set slider on IRC replacement 50Ω from one end.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
36	11000Ω	3.1Ω	480Ω	.5Ω	25594-C	A-3879#	T22547#	A-2932#	#Bend mounting tabs down, file out slots and mount on original brackets.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
37	FIELD PM	VC IMP. 3.1Ω	25593	ST-107† Mod. P5-V	5A07†	†Fabricate new mounting bracket.
38	COIL DIA. 4-5/8"	VC DIA. 1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.
39	Ant. Coil	63Ω	5.2Ω	25989	14-1056
40	Osc. Coil	7.5Ω	7.2Ω	25988	14-1060
41	Input IF	17.5Ω	17.5Ω	25621	16-6658
42	Output IF	17.5Ω		25622	16-6670

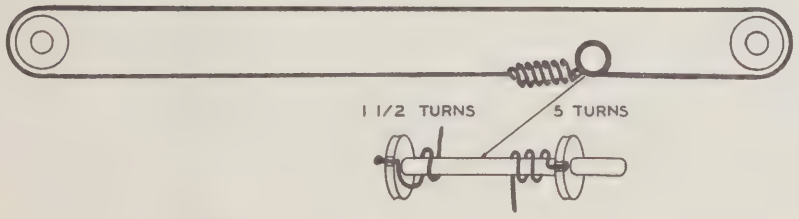
BATTERIES

ITEM No.	VOLTAGE	AIRLINE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
43	9V "A" 90V "B"	62-54			#754			G6M60	

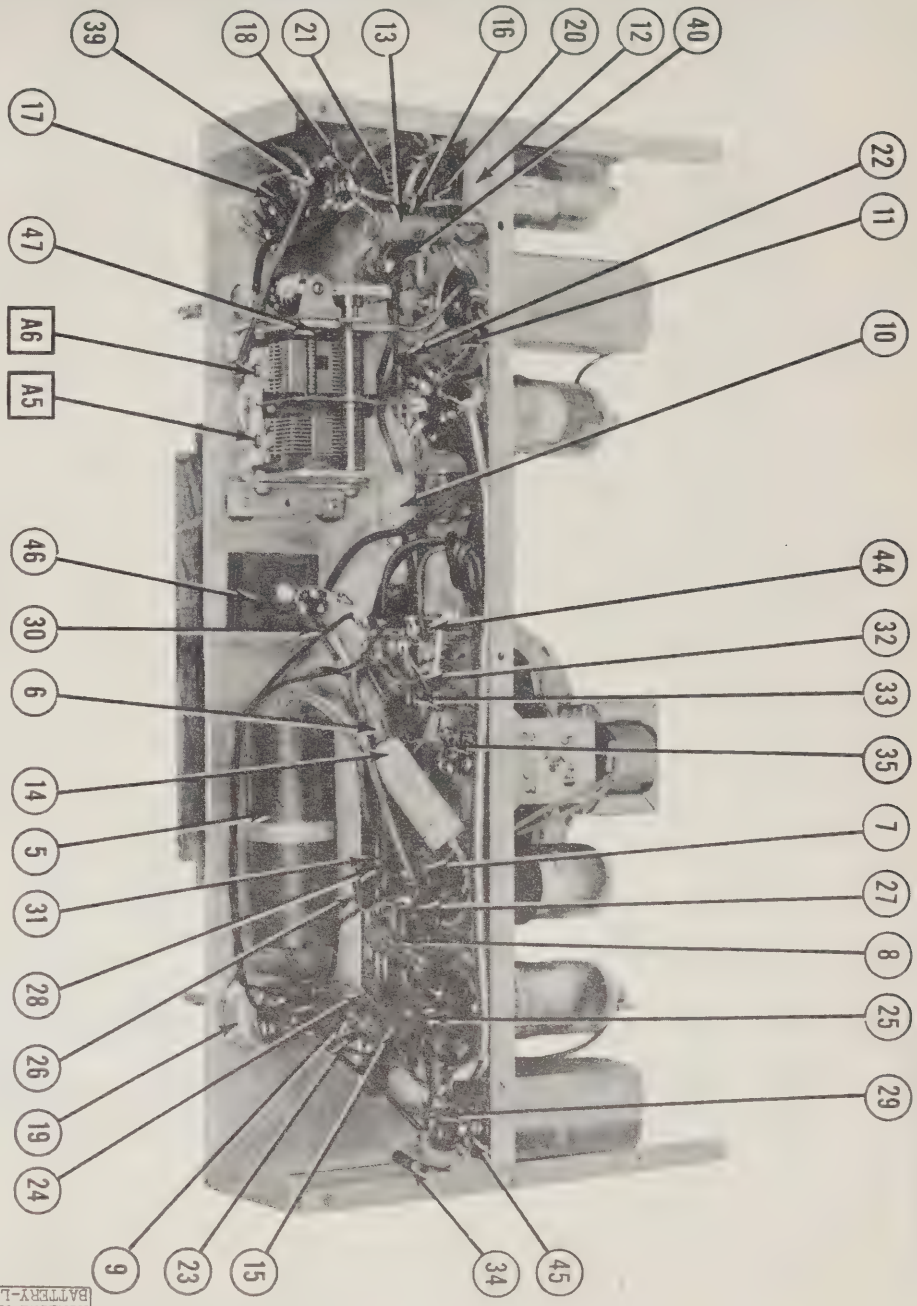
MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
44	Switch	26011	AC/DC-Batt.
45	"	25319	Economizer
46	Rectifier	26002	Rectifier (100MA)
47	2 Gang Var. Cap.	26028	(23-438MMF, 28-193MMF)
	Dial Scale	25966	Plastic
	Dial Pointer	25986	

TUNING GANG FULLY CLOSED



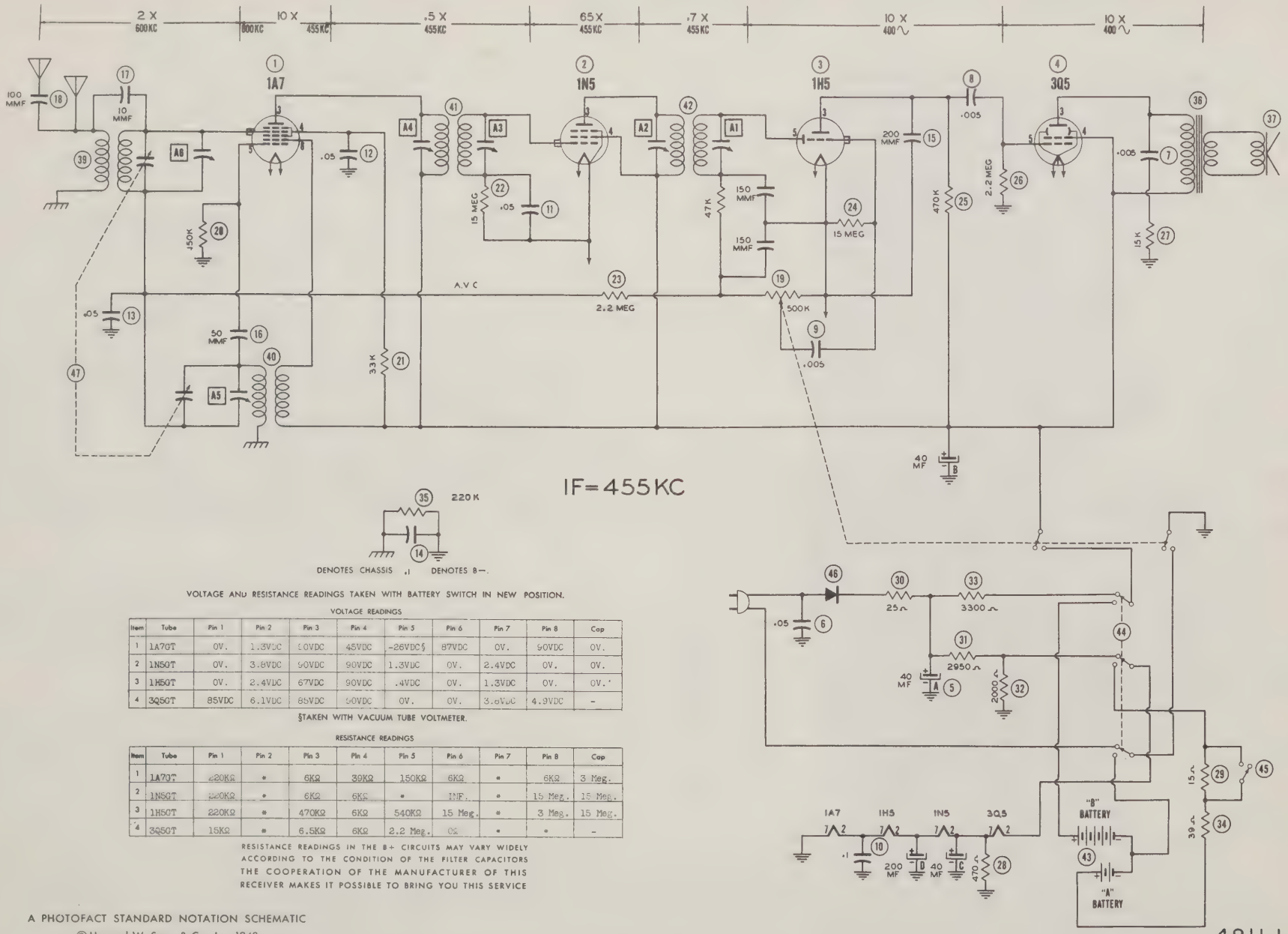
CHASSIS—BOTTOM VIEW



AIRLINE MODEL 74KR-1210A BATTERY-LINE OPERATED

AIRLINE MODEL 74KR-1210A BATTERY-LINE OPERATED

DATE 5/48-44811-1 SET #41-FOLDER #1



VOLTAGE AND RESISTANCE READINGS TAKEN WITH BATTERY SWITCH IN NEW POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1A7GT	0V.	1.3VDC	10VDC	45VDC	-26VDC§	87VDC	0V.	90VDC	0V.
2	1N5GT	0V.	3.8VDC	90VDC	90VDC	1.3VDC	0V.	2.4VDC	0V.	0V.
3	1H5GT	0V.	2.4VDC	67VDC	90VDC	.4VDC	0V.	1.3VDC	0V.	0V.
4	3Q5GT	85VDC	6.1VDC	85VDC	90VDC	0V.	0V.	3.6VDC	4.9VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1A7GT	220KΩ	*	6KΩ	30KΩ	150KΩ	6KΩ	*	6KΩ	3 Meg.
2	1N5GT	220KΩ	*	6KΩ	6KΩ	*	INF.	*	15 Meg.	15 Meg.
3	1H5GT	220KΩ	*	470KΩ	6KΩ	540KΩ	15 Meg.	*	3 Meg.	15 Meg.
4	3Q5GT	15KΩ	*	6.5KΩ	6KΩ	2.2 Meg.	0Ω	*	*	-

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4811-1

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC line to Pin 7 of 1H5GT.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

FM TUNER

TRADE NAME	Approved, FM Tuner
MANUFACTURER	Approved Electronics Instrument Corp., 142 Liberty St., New York,6, N.Y.
TYPE SET	AC Operated FM Tuner with Power Supply
TUBES (EIGHT)	Types, 6AK5 or 6AG5 RF Amp., 6J6 Converter, 6SH7 1st IF Amp., 6SA7 2nd IF Amp., 6SH7 Limiter, 6AL5 Discriminator, 6U5 Tuning Eye, 7Y4 Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—FREQ. MOD.	88-108MC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.
If a VTVM is not available a 20KΩ per volt DC voltmeter may be used.
To set pointer turn tuning control fully counter-clockwise and set pointer 1/16" to the left of 88MC calibration mark.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep except in Step 3 where 250KC sweep is used.
Connect synchronizing voltage from signal generator to horizontal input of scope. If this voltage is not available it may be obtained from AC power line. Some phase shift may be encountered between the two scope sweep voltages resulting in a double trace pattern. If the signal generator or scope has phasing control rotate it to maintain single trace pattern. If this control is not available or synchronizing voltage is taken from AC power line the same thing may be accomplished by inserting a cap. of suitable value (.01-.1 MFD) in series with the scope horizontal synchronizing voltage.
Connect output of an AM signal generator, set to 10.7MC, in series with 50 MMFD cap. in parallel with the FM signal generator to provide marker pip and attenuate output to just provide usuable marker pip.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD	High side to Pin 4 (grid) of 6SH7 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Modulated)	High freq. end of dial	Vertical input to Point Ⓐ. Ground to chassis.	A1,A2, A3,A4.	Adjust for maximum amplitude, symmetry and centering of marker pip on pattern per Fig. 1.
2	.01 MFD	High side to Pin 6 (grid) of 6J6 Mixer Tube (2). Low side to chassis.	"	"	"	A5,A6	Disconnect B+ side of resistor (45) from B+. Adjust A5 & A6 for maximum amplitude, symmetry and centering of marker pip on pattern per Fig. 1.
3	.01 MFD	High side to Pin 4 (grid) of 6SH7 2nd IF Tube (4). Low side to chassis.	10.7MC (Freq. Modulated) 250KC sweep)	"	Vertical input to Point Ⓑ. Ground to chassis.	A7,A8	Alternately adjust A7 for maximum amplitude and straightness of the diagonal line, and A8 for centering of marker pip on the horizontal scope line. Reconnect resistor (45) to B+. Continue with RF Alignment, Step 9.

FIG. 1

FIG. 2

FOR ALTERNATE IF ALIGNMENT AND RF ALIGNMENT SEE PAGE 5 OF THIS FOLDER.

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DATE 5/48-#4811-2 SET #41-FOLDER #2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: APPROVED ELECTRONICS PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1A	RF Amp.	6AK5	6AK5	7BD	
B	" "	6AG5	6AG5	7BD	
2	Converter	6J6	6J6	7BF	
3	1st IF Amp.	6SH7	6SH7	8BK	
4	2nd IF Amp.	6SH7	6SH7	8BK	
5	Limiter	6SH7	6SH7	8BK	
6	Discriminator	6AL5	6AL5	6BT	
7	Tuning Eye	6U5	6U5	6R	
8	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: APPROVED ELECT. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	20	400		AF2222J*	UP1111454	DY-4x10-450*	EL-410*	A■ Filter
B	20	400						●– "
10	.01	600		684-01	DT6S1	MPH-6-01	TC-11	Line Filter
11	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
12	.01	600		684-01	DT6S1	ST-6-01	TC-11	Limiter Screen Bypass
13	.01	600		684-01	DT6S1	ST-6-01	TC-11	2nd IF Decoupling
14	.01	600		684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
15	.01	600		684-01	DT6S1	ST-6-01	TC-11	2nd IF Grid Filter
16	.01	600		684-01	DT6S1	ST-6-01	TC-11	Tuning Ind. Grid Filter
17	.01	600		684-01	DT6S1	ST-6-01	TC-11	1st IF Decoupling
18	.01	600		684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
19	.006	600		684-006	DT6D6	ST-6-006	TC-26	1st IF Screen Bypass
20	.01	600		684-01	DT6S1	ST-6-01	TC-11	1st IF Grid Filter
21	.01	600		684-01	DT6S1	ST-6-01	TC-11	Mixer Plate Decoup.
22	1000	300		1468-001	1W5D1	MO.3-21	1FM-21	De-emphasis -Cer.
23	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	RF Bypass-Cer.
24	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
25	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Limiter Grid Filter-Cer.
26	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
27	2	300						Osc. Coupling-Cer.
28	1000	300		1468-001	1W5D1	MO.3-21	1FM-21	Filament Bypass-Cer.
29	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling-Cer.
30	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
31	200	300		1468-0002	5W5T2	MO.5-32	1FM-32	RF Bypass Pwr. Supply-Cer.
32	1000	300		1468-001	1W5D1	MO.3-21	1FM-21	RF Decoupling-Cer.
33	1000	300		1468-001	1W5D1	MO.3-21	1FM-21	RF Screen Bypass-Cer.
34	1000	300		1468-001	1W5D1	MO.3-21	1FM-21	Filament Bypass-Cer.
35	10	300		1468-00001	5W5Q1	MO.5-41	1FM-41	RF Coupling-Cer.

*Parallel sections to obtain desired capacity.

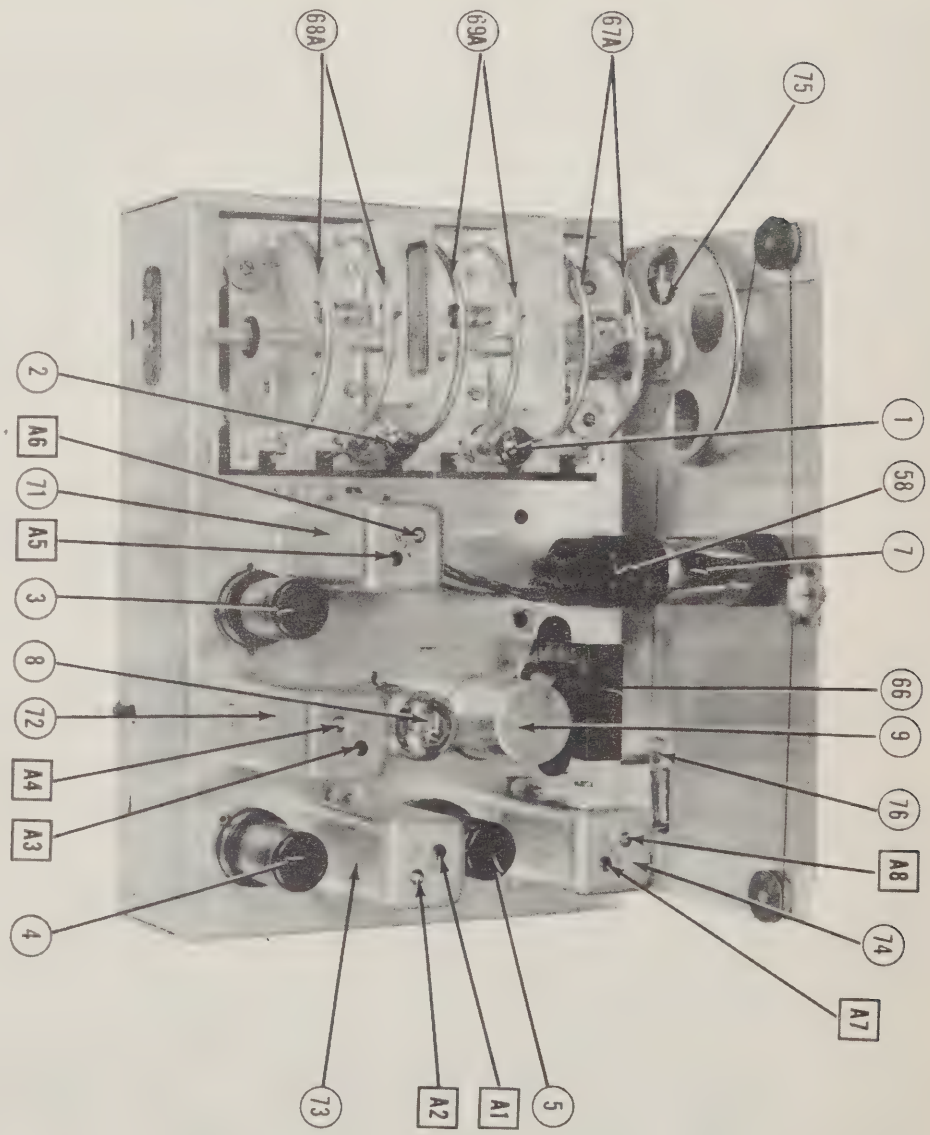
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: APPROVED ELECT. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
36A	500KΩ	½		D13-133	M-60-2	Volume Control
B	Shaft			A	Not Req.	Attach to 36A per instructions
C	Switch			41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: APPROVED ELECTRONICS PART No.	IRC PART No.	IDENTIFICATION CODES
37	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. RF Grid
38	8000Ω	½		BTS-8200	Gray-Blk.-Red RF Screen Dropping
39	2700Ω	½		BTS-2700	Red-Vi.-Red RF Plate Load
40	1000Ω	½		BTS-1000	Br.-Blk.-Red RF Decoupling
41	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. Mixer Grid
42	1000Ω	½		BTS-1000	Br.-Blk.-Red Parasitic Suppressor
43	1000Ω	½		BTS-1000	Br.-Blk.-Red Mixer Decoupling
44	18KΩ	½		BTS-18K	Br.-Gray-Or. Oscillator Grid
45	8000Ω	½		BTS-8200	Gray-Blk.-Red Voltage Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA APPROVED ELECTRONICS PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
46	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. 1st IF Grid
47	25KΩ	½		BTS-27K	Red-Grn.-Or. 1st IF Transformer Shunt
48	8000Ω	½		BTS-8200	Gray-Blk.-Red 1st IF Screen Dropping
49	1000Ω	½		BTS-1000	Br.-Blk.-Red 1st IF Plate Decoupling
50	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. 2nd IF Grid
51	25KΩ	½		BTS-27K	Red-Grn.-Or. 2nd IF Transformer Shunt
52	8000Ω	½		BTS-8200	Gray-Blk.-Red 2nd IF Screen Dropping
53	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
54	68KΩ	½		BTS-68K	Blue-Gray-Or. Limiter Grid
55	30KΩ	½		BTS-33K	Or.-Blk.-Or. Limiter Voltage Dropping
56	30KΩ	½		BTS-33K	Or.-Blk.-Or. Bleeder
57	25KΩ	½		BTS-27K	Red-Grn.-Or. 3rd IF Transformer Shunt
58	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Indicator Plate Load
59	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Indicator Grid Network
60	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Indicator Grid Network
61	68KΩ	½		BTS-68K	Blue-Gray-Or. Isolation
62	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
63	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " "
64	100KΩ	½		BTS-100K	Br.-Blk.-Yl. De-emphasis

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA APPROVED ELECTRONICS PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDARSON PART No.	REPLACEMENT DATA MERIT PART No.
65	117V AC @ .25A	113V AC @ .032A	6.0V AC @ 2.9A					

FILTER CHOKE

ITEM NO.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000)	REPLACEMENT DATA APP. ELECT. PART NO.	REPLACEMENT DATA STANCOR PART NO.	REPLACEMENT DATA THORDARSON PART NO.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
66	.032A	315Ω	5.5 Henries		C-17061	T-200521	C-2975†	†Drill one new mounting hole.

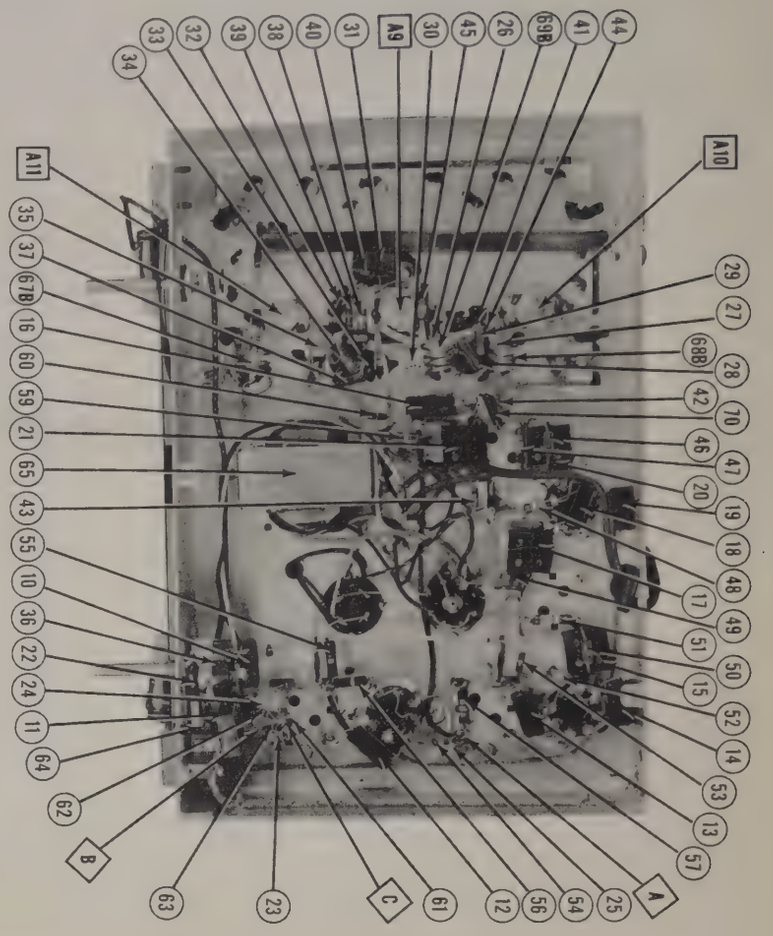
R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA APPROVED ELECTRONICS PART No.	REPLACEMENT DATA MEISSNER PART No.
67A	Ant. Coil		0Ω		
B	Ant. Tuned Line		0Ω		
68A	RF Coil		0Ω		
B	RF Tuned Line		0Ω		
69A	Osc. Coil		0Ω		
B	Osc. Tuned Line		0Ω		
70	Conv. Plate Coil		0Ω		
71	1st IF	.3Ω	.3Ω		
72	2nd IF	.3Ω	.3Ω		
73	3rd IF	.3Ω	.3Ω		
74	FM Disc. Coil	.3Ω	.3Ω		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA APPROVED ELECTRONICS PART No.	INSTALLATION NOTES
75	Bayonet	6-8	0.15	Brown		Type 47
76	"	"	"	"		" "

CHASSIS—BOTTOM VIEW



IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Attenuate output of signal generator to maintain maximum meter reading of 2 volts.

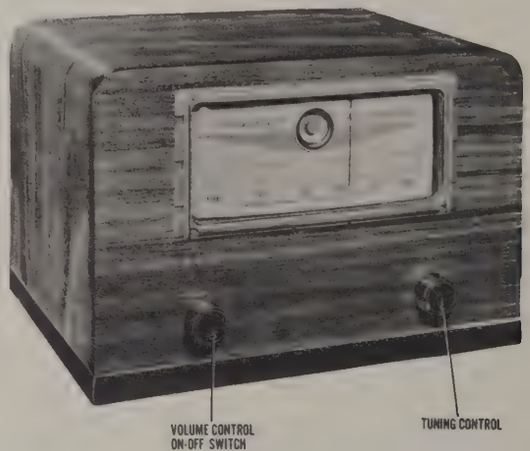
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01 MFD	High side to Pin 4 (grid) of 6SH7 2nd IF Tube (4). Low side to chassis.	10.7MC (unmodulated)	High freq. end of dial.	DC probe to Point A. Common to chassis.	A1	Shunt 47MMFD cap. across primary winding of 3rd IF Transformer (73) and adjust A1 for maximum deflection.
2	.01 MFD	"	"	"	"	A2	Transfer 47MMFD cap. to secondary winding of same transformer and adjust A2 for maximum deflection.
3	.01 MFD	High side to Pin 4 (grid) of 6SH7 1st IF Tube (3). Low side to chassis.	"	"	"	A3	Transfer 47MMFD cap. to primary winding of 2nd IF Transformer (72) and adjust A3 for maximum deflection.
4	.01 MFD	"	"	"	"	A4	Transfer 47MMFD cap. to secondry winding of same transformer and adjust A4 for maximum deflection.
5	.01 MFD	High side to Pin 6 (grid) of 6J6. Mixer. Low side to chassis.	"	"	"	A5	Transfer 47MMF cap. to primary winding of 1st IF transformer (71) and adjust A5 for maximum deflection.
6	.01 MFD	"	"	"	"	A6	Transfer 47MMFD cap. to secondary winding of same transformer and adjust A6 for maximum deflection.
7	.01 MFD	High side to Pin 4 (grid) of 6SH7 2nd IF Tube (4). Low side to chassis.	"	"	DC probe to Point A. Common to chassis	A7	Adjust for maximum deflection.
8	.01 MFD	"	"	"	DC probe to Point A. Common to chassis	A8	Adjust for zero deflection. Tune sig. gen. 250KC above and 250KC below 10.7MC in 50KC steps recording meter reading at each step. These readings should increase linearly either side of 10.7 MC resulting in a curve similar to Fig. 2. If such is not the case repeat Steps 7 & 8.

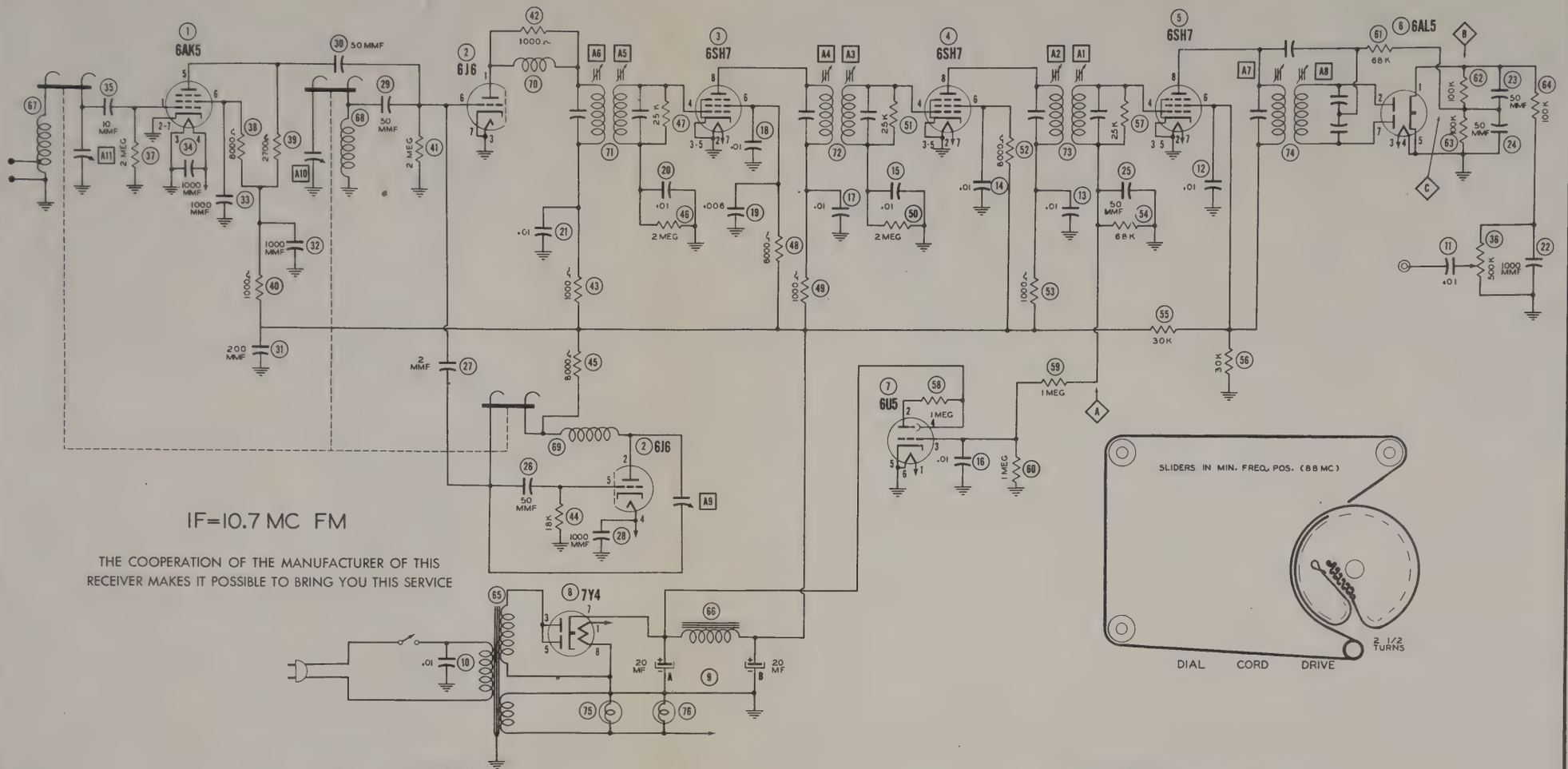
FOR ALTERNATE IF ALIGNMENT SEE FRONT PAGE OF THIS FOLDER

RF ALIGNMENT

Attenuate output of signal generator to maintain maximum meter reading of 2 volts.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	300Ω carbon res.	High side to ungrounded ant. terminal. Low side to chassis.	108MC (unmodulated)	108MC	DC probe to Point A. Common to chassis.	A9	Adjust for maximum deflection. Tune sig. gen. to 86.6MC. If meter deflection is not noted retune sig. gen. to 108MC and increase capacity of A9 to next peak. Adjust for maximum deflection and recheck for image.
10	"	"	"	Tune for maximum deflection	"	A10,A11	"
11	"	"	90MC (unmodulated)	90MC	"	Osc. Coil (69A)	Expand or compress oscillator coil (69A) slightly for maximum deflection. Repeat Steps 9, 10 & 11 until no further improvement can be made.





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AK5	-.7VDC	0V.	0V.	6VAC	80VDC	80VDC	0V.	-
2	6J6	100VDC	55VDC	0V.	6VAC	-7.5VDC§	-.2VDC	0V.	-
3	6SH7	0V.	0V.	0V.	-.3VDC	0V.	86VDC	6VAC	97VDC
4	6SH7	0V.	0V.	0V.	-.3VDC	0V.	86VDC	6VAC	97VDC
5	6SH7	0V.	0V.	0V.	-.6VDC	0V.	27VDC	6VAC	27VDC
6	6AL5	0V.	-.4VDC	6VAC	0V.	0V.	0V.	-.4VDC	-
7	6U5	6VAC	7.5VDC	-.6VDC	112VDC	0V.	0V.	-	-
8	7Y4	6VAC	0V.	113VAC	113VAC	113VAC	113VAC	112VDC	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AK5	2 Meg.	0Ω	0Ω	.1Ω	54KΩ	55KΩ	0Ω	-
2	6J6	50KΩ	58KΩ	0Ω	.1Ω	20KΩ	2 Meg.	0Ω	-
3	6SH7	0Ω	0Ω	0Ω	2 Meg.	0Ω	58KΩ	.1Ω	50KΩ
4	6SH7	0Ω	0Ω	0Ω	2 Meg.	0Ω	58KΩ	.1Ω	50KΩ
5	6SH7	0Ω	0Ω	0Ω	2 Meg.	0Ω	68KΩ	0Ω	22KΩ
6	6AL5	150KΩ	170KΩ	.1Ω	0Ω	0Ω	0Ω	170KΩ	-
7	6U5	.1Ω	1 Meg.	500KΩ	50KΩ	0Ω	0Ω	-	-
8	7Y4	.1Ω	INF.	170Ω	170Ω	170Ω	170Ω	50KΩ	0Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

BENDIX MODELS 110, 110W, 111
111W, 112, 114, 115

BENDIX MODELS 110, 110W, 111
111W, 112, 114, 115

BENDIX MODEL 110

TRADE NAME	Bendix, Model 110, 110W, 111, 111W, 112, 114, 115
MANUFACTURER	Bendix Radio, Div. of Bendix Aviation Corp., Baltimore, Md.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are four calibration marks on dial backplate frame. Reading from left to right they are: End limit, 580KC, 965KC and 1475KC. Turn tuning cap. fully open and set pointer to end limit mark.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD.	High side to external antenna lead. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1, A2, A3, A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	50 MMFD.	"	1475KC	1475KC reference mark.	"	A5	Adjust for maximum output. The adjustment opposite A5 is a factory adjustment and ordinarily need not be changed.
3	50 MMFD	"	"	Tune for maximum output.	"	A6	Adjust for maximum output. Check calibration at 965KC & 580KC. If pointer does not fall within width of calibration marks bend tuning cap. rotor plates to correct calibration. If rotor plates are bent then Steps 2 & 3 must be repeated.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: BENDIX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	6R	
2	IF Amp.	12SK7	12SK7	6N	
3	Det.-AVC-AF	12SQ7	12SQ7	6Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	5AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BENDIX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	CE2D01	PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Blue
B	40	150						" -Red
7	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	Line Filter
8	.02	400	CP4T34	484-02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
9	.006	400	CP4T20	484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
10	.006	400	CP4T20	484-006	DT6D6	ST-6-006	TC-26	" "
11	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	AVC Filter-See Note
12	.05	400	CP4T40	484-05	DT4S5	ST-4-05	TC-15	Tuning Cap. Isolation
13	.1	200	CP4T51	484-.1	DT2P1	ST-3-1	72P2	Line Isolation
14	680	300	CC9K44	1479-0007	1W5T7	M0.3-37	1FM-37	AF Plate Bypass-Cer.
15	47	500	CC6A30	1468-00005	5W5Q5	M0.5-45	1FM-45	Osc. Grid Cap.
16	470	500		1468-0005	5W5T5	M0.5-35	1FM-35	RF Coupling-See Note
17	4.7	500	CC9A18	1468-000005	5W5V5	M0.5-55	MS-55	Ext. Ant. Coupling-Cer.

Note-Not used in Models 110, 111, 112.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BENDIX PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
18A	500KΩ	½	RV0S02	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 18A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

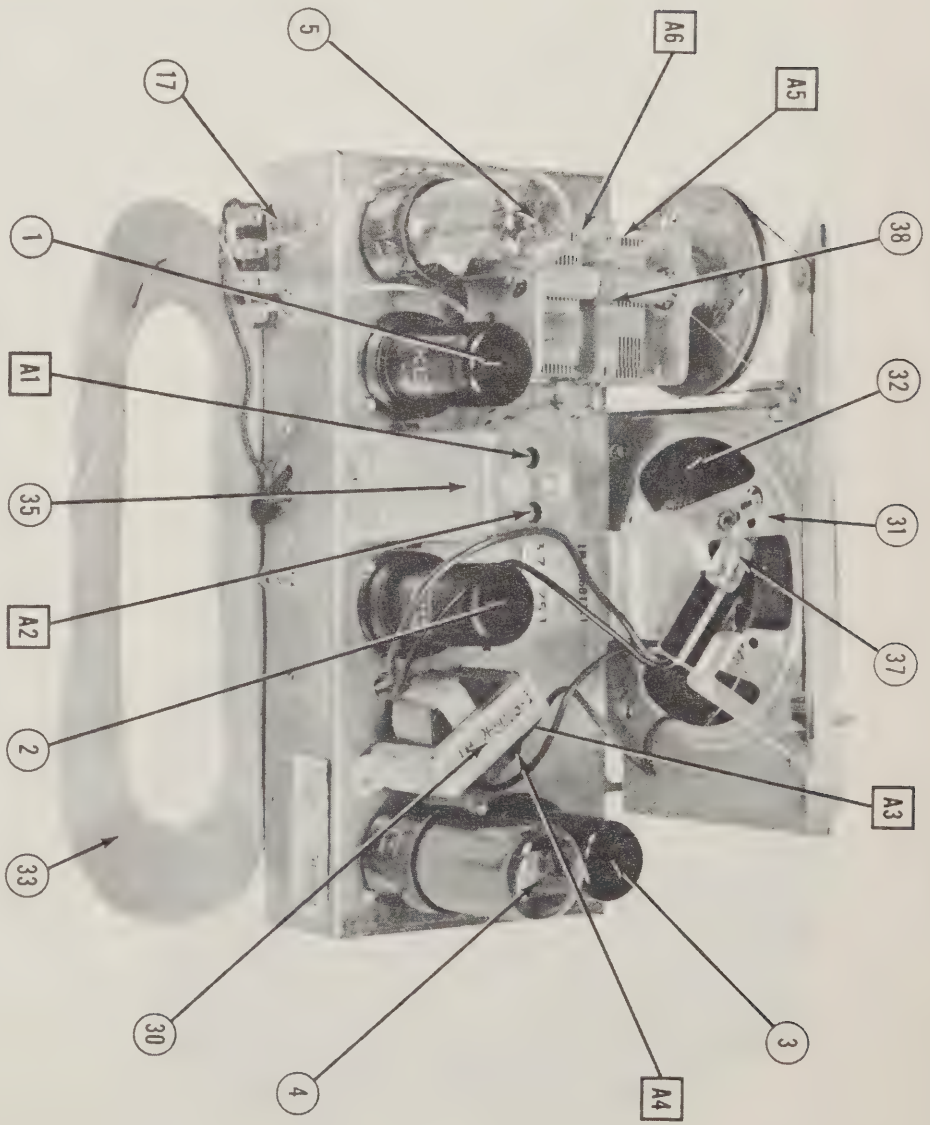
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BENDIX PART No.	IRC PART No.	IDENTIFICATION CODES
19	220KΩ	½	RC1H54	BTS-220K	Red-Red-Yl. Line Isolation
20	22KΩ	½	RC1H40	BTS-22K	Red-Red-Or. Oscillator Grid
21	15 Meg.	½	RC1H76	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
22	3.3 Meg.	½	RC1H68	BTS-3.3 Meg.	Or.-Or.-Grn. " "
23	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Converter Grid-See Note
24	47KΩ	½	RC1H44	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
25	4.7 Meg.	½	RC1H70	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
26	220KΩ	½	RC1H54	BTS-220K	Red-Red-Yl. AF Plate Load
27	470KΩ	½	RC1H58	BTS-470K	Yl.-Vi.-Yl. Output Grid
28	150Ω	1	RW1B28	BW-1-150	Output Cathode
29	2200Ω	2	RC4H28	BT-2-2200	Red-Red-Red Filter

Note-Not used in Models 110, 111, 112.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: BENDIX PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
30	2000Ω	3.2Ω	170Ω tapped @ 102	.8Ω	LH-285023	A-3751		A-2[illegible]1	Add extra filter to reduce hum level.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA BENDIX PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-105*		*Fabricate new mounting bracket.
31	PM	3.3Ω	LH-256017-1	Mod. P5-X	4A07*	
	CONE DIA.	VC DIA.				
32	4"	1/2"				

R F COILS

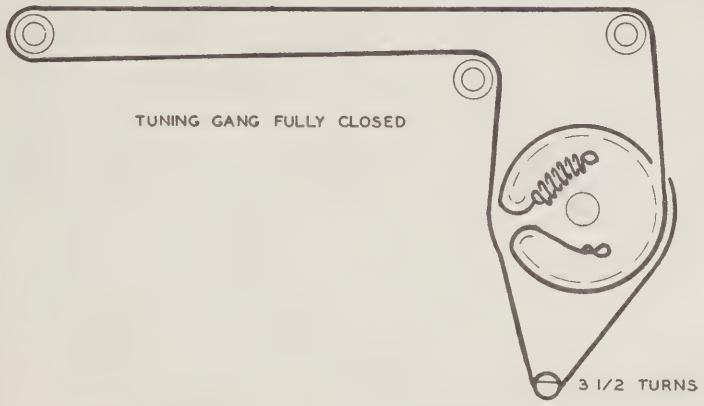
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA BENDIX PART No.	REPLACEMENT DATA MEISSNER PART No.
33	Ant. Loop		1Ω	AL0Z10	
34	Osc. Coil	4.7Ω	.7Ω	L05B03	14-1060
35	Input IF	19.5Ω	16.7Ω	T10C09	16-6658
36	Output IF	27.5Ω	27.5Ω	T10D12	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA BENDIX PART No.		INSTALLATION NOTES
37	Bayonet	6-8	0.15	Brown	#47		Type 47

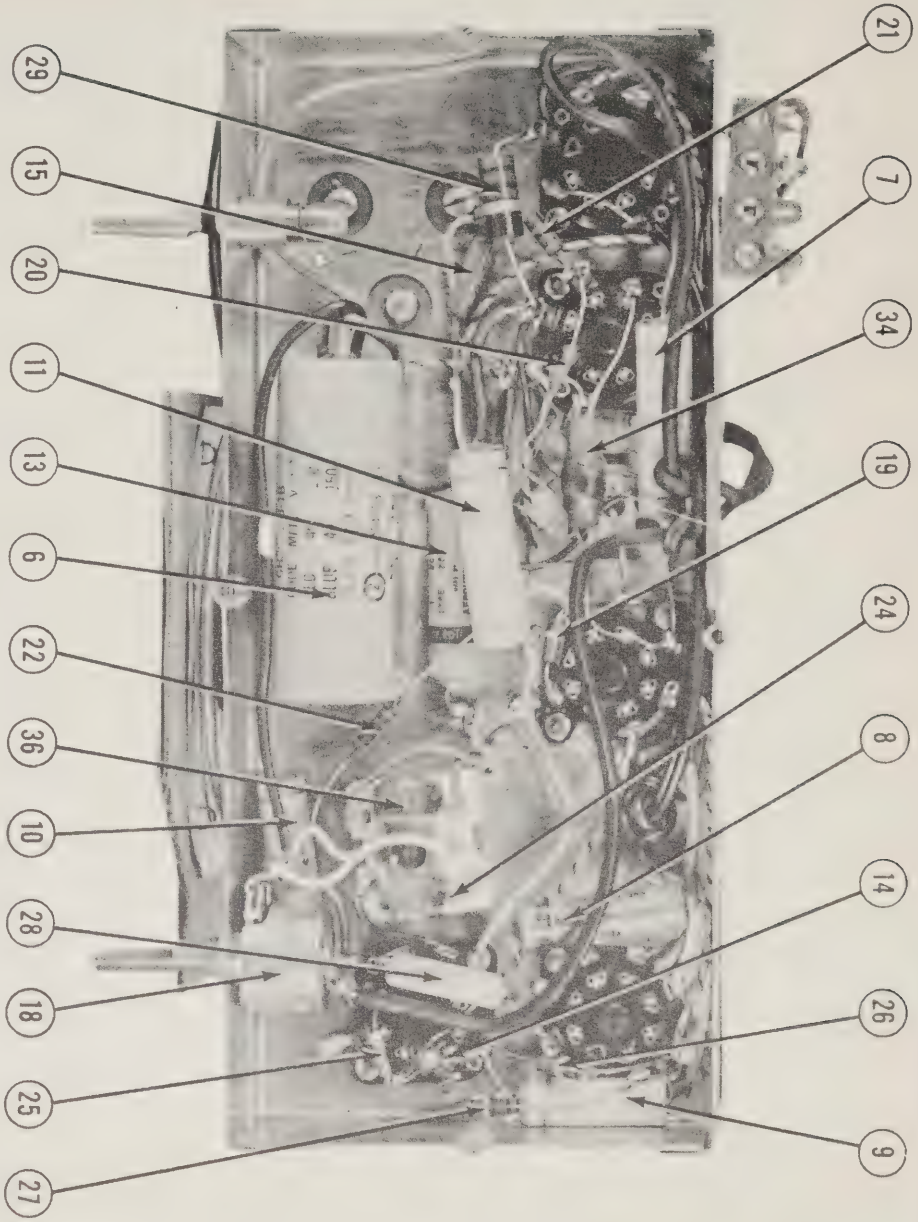
MISCELLANEOUS

ITEM No.	PART NAME	BENDIX PART No.	NOTES
38	2 Gang Var. Cap.	CV0B05	(38-476MMF, 38-220MMF)
	Dial Window	WP0D01	
	Dial Scale	DS0A23	Model 110
	" "	DS0A22	" 110W
	" "	DS0A25	" 111
	" "	DS0A30	" 111W
	" "	DS0A33	" 114, 115



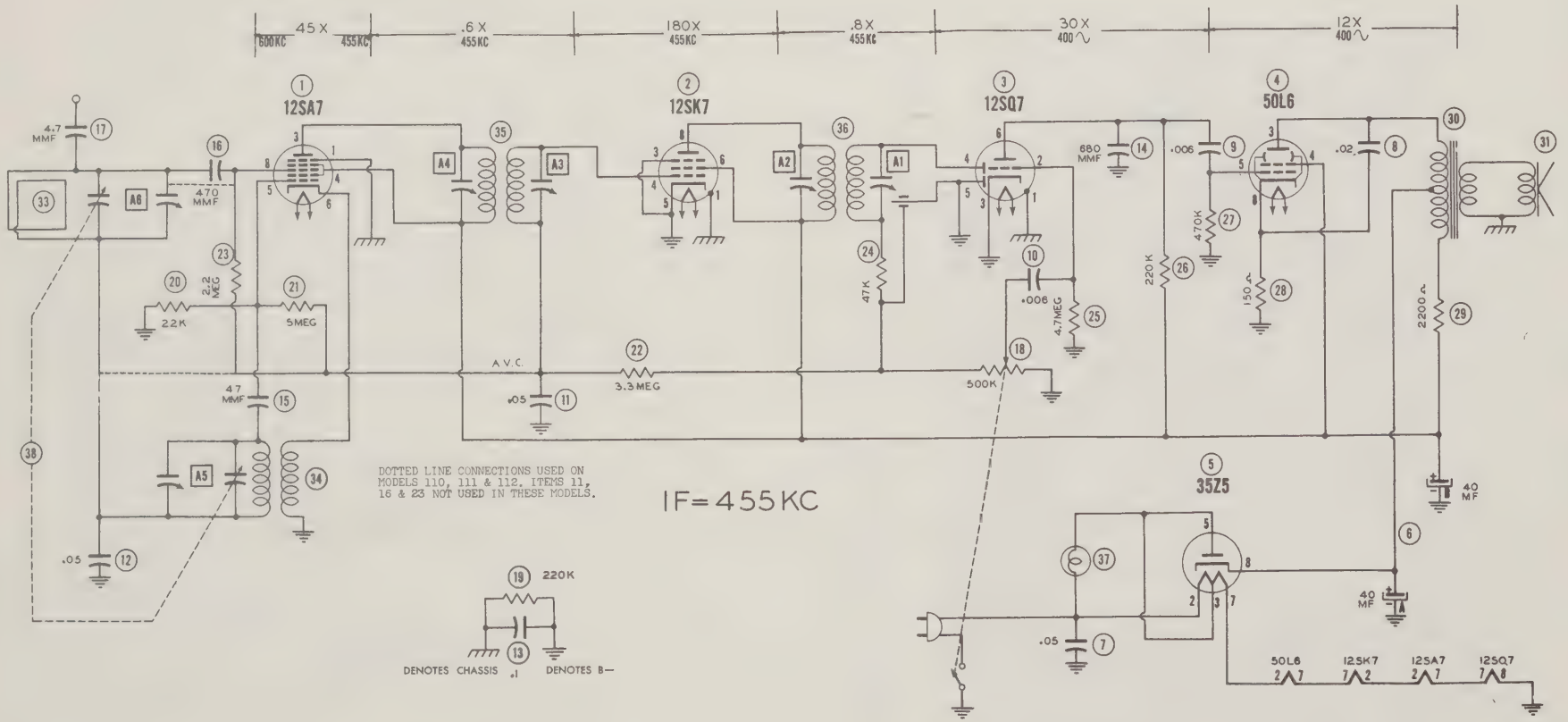
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



BENDIX MODELS 110, 110W, 111, 111W, 112, 114, 115

BENDIX MODELS 110, 110W, 111, 111W, 112, 114, 115



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	24VAC	80VDC	80VDC	-7VDC	0V.	13VAC	-.3VDC
2	12SK7	0V.	24VAC	0V.	-.3VDC	0V.	80VDC	37VAC	80VDC
3	12SQ7	0V.	-.4VDC	0V.	-.3VDC	0V.	55VDC	13VAC	0V.
4	50L6GT	0V.	85VAC	122VDC	80VDC	0V.	0V.	37VAC	5.3VDC
5	35Z5GT	0V.	117VAC	112VAC	0V.	112VAC	127VDC	85VAC	127VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	240KΩ	23Ω	200KΩ	200KΩ	22KΩ	.7Ω	12Ω	3.8 Meg.
2	12SK7	220KΩ	23Ω	0Ω	3.8 Meg.	0Ω	200KΩ	36Ω	200KΩ
3	12SQ7	220KΩ	4.7 Meg.	0Ω	540KΩ	0Ω	67OKΩ	12Ω	0Ω
4	50L6GT	INF.	87Ω	200KΩ	200KΩ	470KΩ	INF.	36Ω	150Ω
5	35Z5GT	INF.	120Ω	112Ω	INF.	112Ω	200KΩ	87Ω	200KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

BROOK MODEL 10D

TRADE NAME	Brook, Model 10C, 10D
MANUFACTURER	Brook Electronics Inc., 34 DeHart Place, Elizabeth, N.J.
TYPE SET	AC Operated Audio Amplifier
TUBES (ELEVEN)	Types, 7A4 AF Amp., 7A4 Phase Inv., (2) 7A4 AF Amp., 7N7 Bias Control, (2) 7A4 Driver, (2) 2A3 or (2) 6B4G Power Output, 5Y3GT Bias Rectifier, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC RATING 1.2 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A4	0V.**	300VDC	0V.	0V.	0V.	0V.	14VDC	0V.**
2	7A4	0V.**	320VDC	0V.	0V.	0V.	22VDC	75VDC	0V.**
3	7A4	0V.	380VDC	0V.	0V.	0V.	0V.	13VDC	6.7VAC
4	7A4	0V.	380VDC	0V.	0V.	0V.	0V.	13VDC	6.7VAC
5	7N7	0V.	1VDC	40VDC	0V.	-.2VDC	37VDC	0V.	6.7VAC
6	7A4	0V.	405VDC	0V.	0V.	0V.	-107VDC	-85VDC	6.7VAC
7	7A4	0V.	405VDC	0V.	0V.	0V.	-107VDC	-85VDC	6.7VAC
8	2A3GT	1.6VDC*‡	410VDC	-85VDC	1.6VDC*‡	-	-	-	-
9	2A3GT	1.6VDC*‡	410VDC	-85VDC	1.6VDC*‡	-	-	-	-
10	5Y3GT	0V.	175VAC	0V.	-200VDC	0V.	-200VDC	0V.	175VAC
11	5U4G	0V.	415VDC	0V.	350VAC	0V.	350VAC	0V.	415VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A4	INF.**	74KΩ	INF.	INF.	INF.	470KΩ	4.7KΩ	INF.**
2	7A4	INF.**	74KΩ	INF.	INF.	INF.	470KΩ	37KΩ	INF.**
3	7A4	0Ω	41KΩ	INF.	INF.	INF.	220KΩ	1KΩ	.1Ω
4	7A4	0Ω	41KΩ	INF.	INF.	INF.	220KΩ	1KΩ	.1Ω
5	7N7	0Ω	15Ω	340KΩ	0Ω	500KΩ	170KΩ	0Ω	.1Ω
6	7A4	0Ω	40KΩ	INF.	INF.	INF.	260KΩ	37KΩ	.1Ω
7	7A4	0Ω	40KΩ	INF.	INF.	INF.	260KΩ	37KΩ	.1Ω
8	2A3GT	25Ω**	40KΩ	37KΩ	25Ω**	-	-	-	-
9	2A3GT	25Ω**	40KΩ	37KΩ	25Ω**	-	-	-	-
10	5Y3GT	INF.	17Ω	INF.	10KΩ	INF.	10KΩ	INF.	17Ω
11	5U4G	INF.	40KΩ	INF.	35Ω	INF.	34Ω	INF.	40KΩ

**-6.6 VOLTS BETWEEN FILAMENT PINS.
*‡-2.5 VOLTS BETWEEN FILAMENT PINS.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum proper output load connected.

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DATE 5/48-#4811-4 SET #41-FOLDER #4

PARTS LIST AND DESCRIPTIONS

BROOK MODELS 10C, 10D

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: BROOK PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1A	AF Amp.	7A4	7A4	5AC	Model 10D
B	AF-Phase Inv.	7N7	7N7	8AC	Model 10C
2A	Phase Inv.	7A4	7A4	5AC	Model 10D
B	AF-Phase Inv.	7N7	7N7	8AC	Model 10C
3	AF Amp.	7A4	7A4	5AC	
4	" "	7A4	7A4	5AC	
5	Bias Cont.	7N7	7N7	8AC	
6	Driver	7A4	7A4	5AC	
7	"	7A4	7A4	5AC	
8A	Power Output	2A3	2A3	4D	
B	" "	6B4G	6B4G	5S	
9A	" "	2A3	2A3	4D	
B	" "	6b4G	6B4G	5S	
10	Bias Rectifier	5Y3GT	5Y3GT	5T	
11	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BROOK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
12	30	475			UP3050		EL-3	◓ Filter
13	30	475			UP3050		EL-3	◓ "
14	30	475			UP3050		EL-3	◓ "
15A	20	450		AF88J	UP4245	DY-3x20-450*	EL-240	■ "
B	40	450						◓▲ "
16	20	450		PRS450-20	BR2045	M-20-450	UT-20	Bias Filter
17	20	450		PRS450-20	BR2045	M-20-450	UT-20	" "
18	40	150		PRS50-150	BR5015	M-50-150	UT-501	Cathode Bypass
19	40	50		PRS50-50	BR505	M-50-50	TA-550	" "
20	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Bias Filter
21	.5	400		484-.5	DT4P5	ST-4-5	TC-5	" "
22	.03	600		684-03	DT6S3	ST-6-03	TC-13	Tone Compensation
23	.03	600		684-03	DT6S3	ST-6-03	TC-13	" "
24	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Audio Coupling
25	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
26	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
27	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
28	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Output Plate Bypass
29	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
30	1000	500		1467-001	1W5D1	MW.5-21	TC-21	Tone Compensation
31	1000	500		1467-001	1W5D1	MW.5-21	TC-21	" "

*Parallel sections to obtain desired capacity.

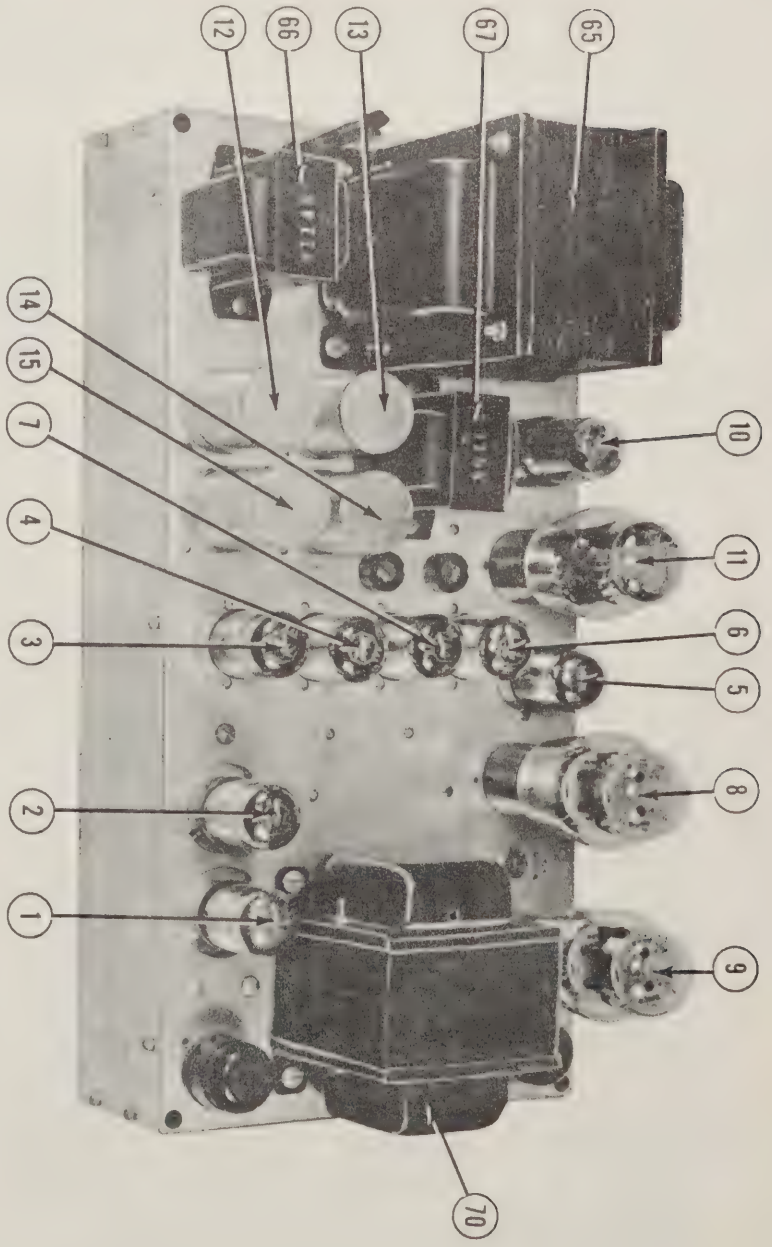
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BROOK PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
32	40Ω	1		W-40	43-40	Hum Bal. Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BROOK PART No.	IRC PART No.	IDENTIFICATION CODES
33	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 1st AF Grid
34	4700Ω	½		BTS-4700	Yl.-Vi.-Red 1st AF Cathode
35	33KΩ	1		BTA-33K	Or.-Or.-Yl. 1st AF Plate Load
36	1000Ω	½		BTS-1000	Br.-Blk.-Red Feedback
37	82Ω	5W-½-P2		Gray-Red-Blk. "	
38	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Phase Inverter Grid
39	4700Ω	½		BTS-4700	Yl.-Vi.-Red Phase Inverter Cathode
40	33KΩ	1		BTA-33K	Or.-Or.-Or. Phase Inverter Cathode
41	33KΩ	1		BTA-33K	Or.-Or.-Or. Phase Inverter Plate Load
42	220KΩ	½		BTS-220K	Red-Red-Yl. 1st Driver Grid
43	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd Driver Grid
44	1000Ω	1		BTA-1000	Br.-Blk.-Red Driver Cathode
45	4700Ω	½		BTS-4700	Yl.-Vi.-Red Tone Compensation
46	4700Ω	½		BTS-4700	Yl.-Vi.-Red " "
47	22KΩ	½		BTS-22K	Red-Red-Or. 3rd Driver Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BROOK PART No.	IRC PART No.	
48	22KΩ	½		BTS-22K	Red-Red-Or. 4th " "
49	27KΩ	2		BT-2-27K	Red-Vi.-Or. 3rd Driver Cathode
50	27KΩ	2		BT-2-27K	Red-Vi.-Or. 4th " "
51	68KΩ	1		BTA-68K	Blue-Gray-Or. Bias Network
52	68KΩ	1		BTA-68K	Blue-Gray-Or. " "
53	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
54	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
55	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
56	150KΩ	½		BTS-150K	Br.-Grn.-Yl. " "
57	150KΩ	½		BTS-150K	Br.-Grn.-Yl. " "
58	360KΩ	½		BTS-330K	Or.-Blue-Yl. " "
59	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
60	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
61	15Ω	5		AB-15	Bias Regulator Cathode
62	1000Ω	1		BTA-1000	Br.-Blk.-Red Filter
63	1000Ω	10		AB-1000	"
64	10KΩ	10		AB-10K	Bleeder

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	BROOK PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
65	117V AC @ 1.2A	700V CT @ .083A tapped 175V AC @ .020A	5.2V AC @ 3.2A	5.2V AC @ 2.0A	W-113F			
		SEC. 4	SEC. 5	SEC. 6				
		2.5V AC @ 2.0A	6.7V CT @ 2.2A	6.3V AC @ 1.1A				

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	BROOK PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
66	.110A	42Ω	1.7 Henries	W-114K				
67	.037A	280Ω	10 Henries	W-114K		T-20C52†	C-2983	†Drill new mounting holes.
68	.008A	1200Ω	35 Henries	W-124L	C-1515	T-20C51†		

TRANSFORMER (DRIVER)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		BROOK PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
69	1 to 1		1240Ω	115Ω	W-115K				
	PRI. 2 to SEC. 2		PRI. 2	SEC. 2					
	1 to 1		1340Ω	115Ω					

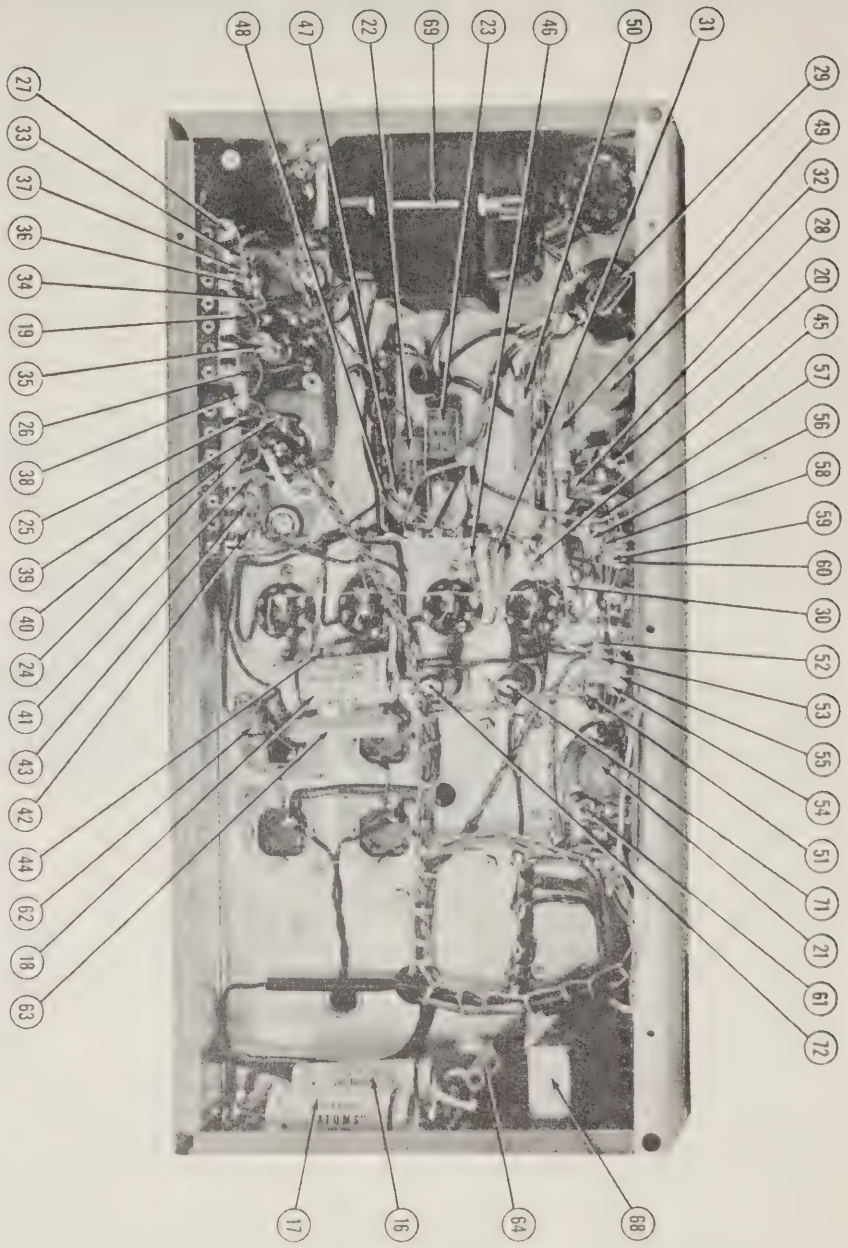
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		BROOK PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
70	4300Ω CT	1-3Ω 3-6Ω 6-11Ω 11-16Ω 16-30Ω 500Ω	230Ω CT	.2Ω .3Ω .7Ω 1.1Ω 1.5Ω 40Ω	W-120K	A-8410	T-23C70	A-2151	

MISCELLANEOUS

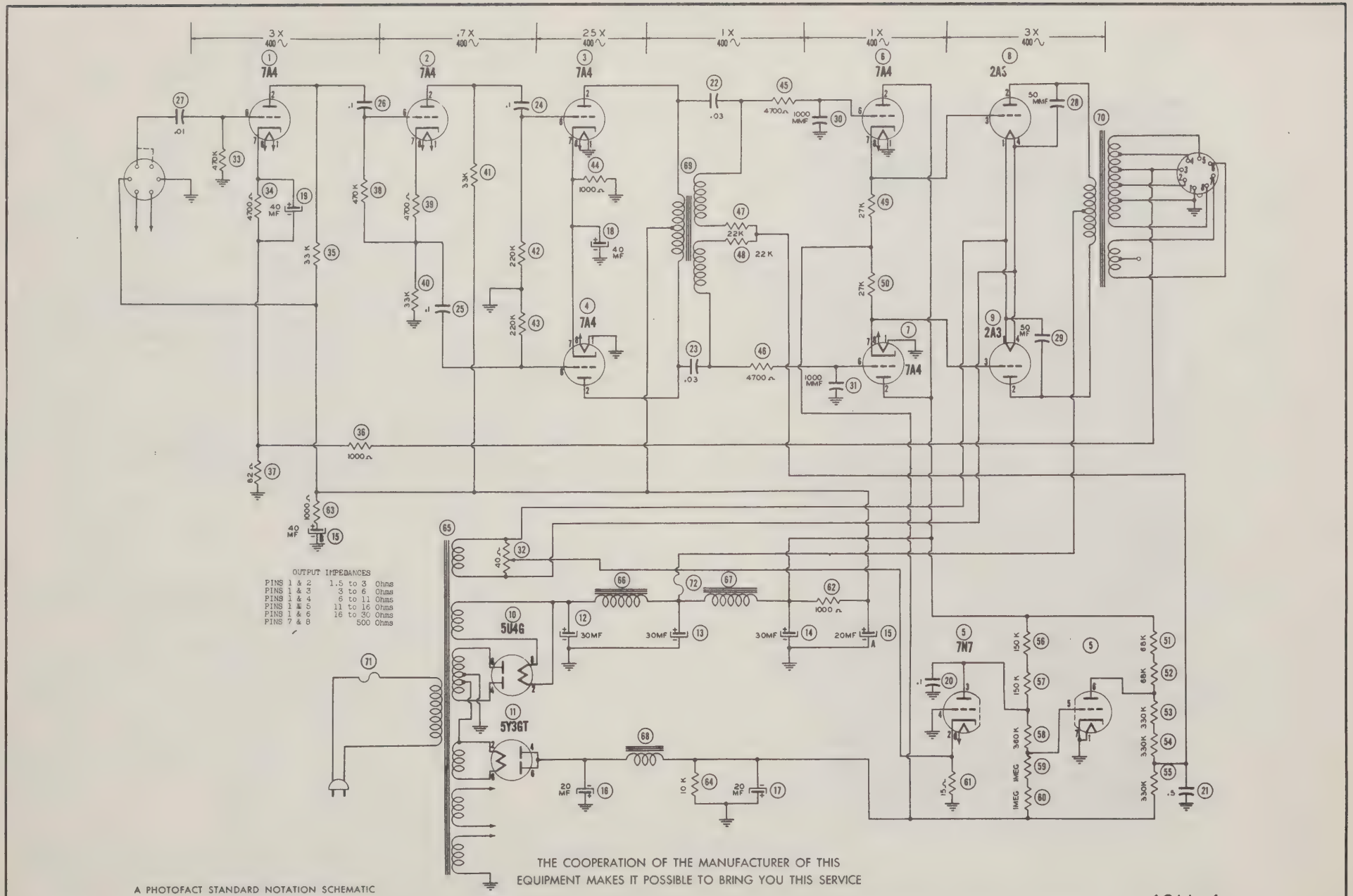
ITEM No.	PART NAME	BROOK PART No.	NOTES
71	Fuse		3 Amp.
72	"		.5 Amp.

CHASSIS—BOTTOM VIEW



BROOK MODELS 10C, 10D

BROOK MODELS 10C, 10D



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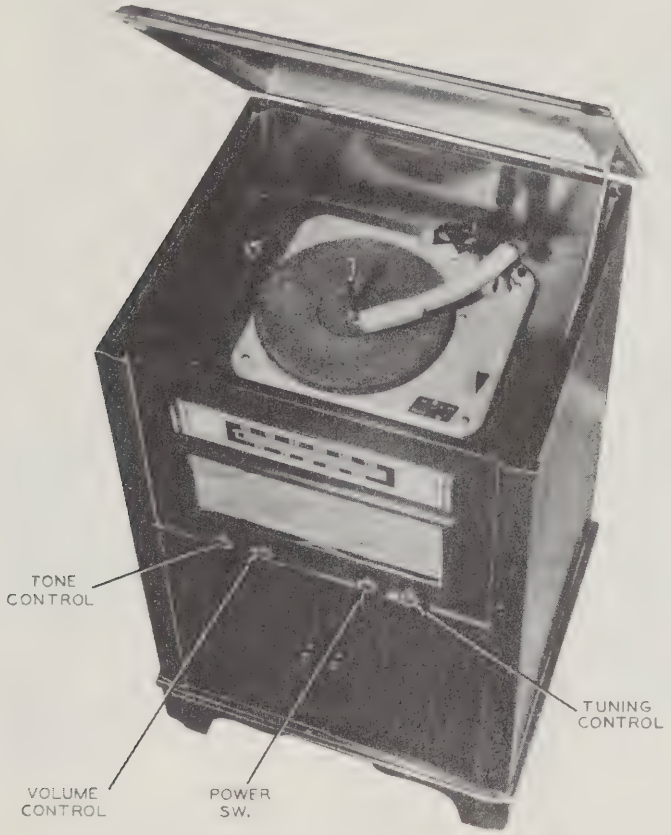
CLARION MODEL
12708



CLARION MODEL 12708

TRADE NAME	Clarion, Model 12708
MANUFACTURER	Warwick Mfg. Corp., 4640 W. Harrison St., Chicago 44, Ill.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	535-1725KC RATING .33 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	250MMFD	"	1725KC	"	"	A5	Adjust for maximum output.
3		Loop	1500KC	Tune for maximum output.	"	A6 .	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

CLARION MODEL 1270S

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		CLARION PART No.	STANDARD REPLACEMENT		
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CLARION PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	40	150	A18-280	PRS150/40	BR4015	M-40-150	UT-401	Filter
6	40	150	A18-280	PRS150/40	BR4015	M-40-150	UT-401	"
7	.1	600	A16-160	684-.1	DT6P1	ST-6-1	TC-1	Line Filter
8	.005	600	A16-153	684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
9	.02	400	A16-150	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
10	.002	600	A16-155	684-002	DT6D2	ST-6-002	TC-22	Tone Compensation
11	.1	200	A16-157	484-.1	DT2P1	ST-2-1	TC-1	AF Plate Decoupling
12	.01	400	A16-156	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
13	.05	200	A16-152	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
14	.2	400	A16-154	484-.2	DT4P2	ST-4-2	72P3	Line Isolation
15	250	500	A15-176	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
16	250	500	A15-176	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
17	50	500	A15-175	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CLARION PART No.	IRC PART No.	CLAROSTAT PART No.	
18A	500KΩ	½	A24-169	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 18A per instructions
19A	2 Meg.	½	A26-123	D13-139	AM-83-S	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 19A per instructions

RESISTORS

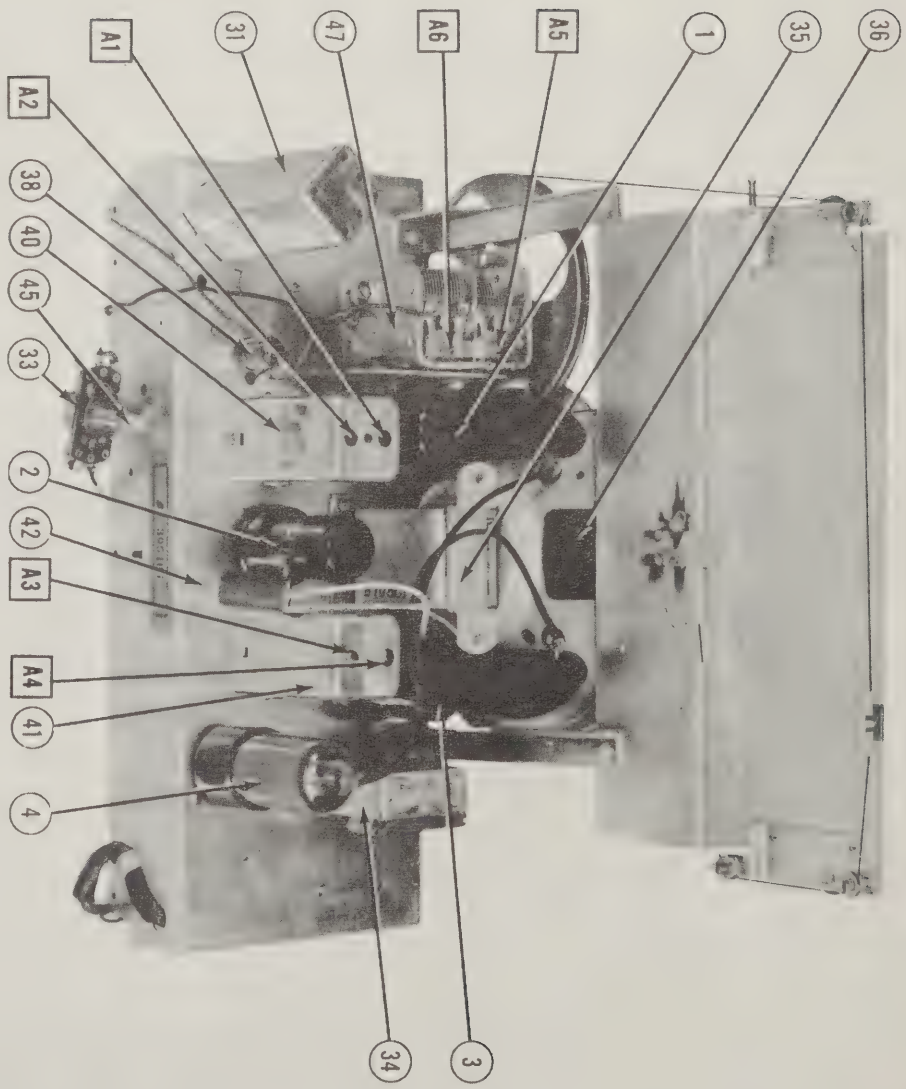
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CLARION PART No.	IRC PART No.	
20	22KΩ	½	A60-659	BTS-22K	Red-Red-Or. Oscillator Grid
21	15 Meg.	½	A60-664	BTS-15K	Br.-Grn.-Blue AVC Network
22	2.2 Meg.	½	A60-684	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
23	470KΩ	½	A60-662	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	220KΩ	½	A60-667	BTS-220K	Red-Red-Yl. AF Plate Load
25	4.7 Meg.	½	A60-669	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
26	470KΩ	½	A60-662	BTS-470K	Yl.-Vi.-Yl. Output Grid
27	110Ω	½	A60-702	BW-½-120	Br.-Red-Br. Output Cathode
28	12KΩ	2	A60-720	BT-2-12K	Br.-Red-Or. Cathode Dropping
29	27Ω	1	A60-721	BW-1-27	Red-Vi.-Blk. Surge Limiter
30	1000Ω	1	A60-699	BTA-1000	Br.-Blk.-Red Filter
31	140Ω - 220Ω		A60-719		Filament String-See Note
32	470KΩ	½	A60-662	BTS-470K	Yl.-Vi.-Yl. Line Isolation
33	220KΩ	½	A60-667	BTS-220K	Red-Red-Yl. Series Phono

Note-This is a special compensating unit. Order from manufacturer.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CLARION PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
34	3000Ω	3.5Ω	300Ω	.8Ω	B-80-230	A-3876	T22S45	A-2028	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: CLARION PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-108#		
35	PM	3.5Ω	B79-351	Mod. P6-X	6A15	#Trim flange
	CONE DIA.	VC DIA.				
36	6"	1/2"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CLARION PART No.	MEISSNER PART No.
37	Loop Ant.	.1Ω	.8Ω	C92-50	
38	Loop Loading		.2Ω	A10-503	
39	Osc. Coil	1Ω	6Ω	B10-411	14-1060
40	1st IF	40Ω	38Ω	B10-453	16-6658
41	2nd IF	39Ω	37Ω	B10-454	16-6660

DIAL LIGHT

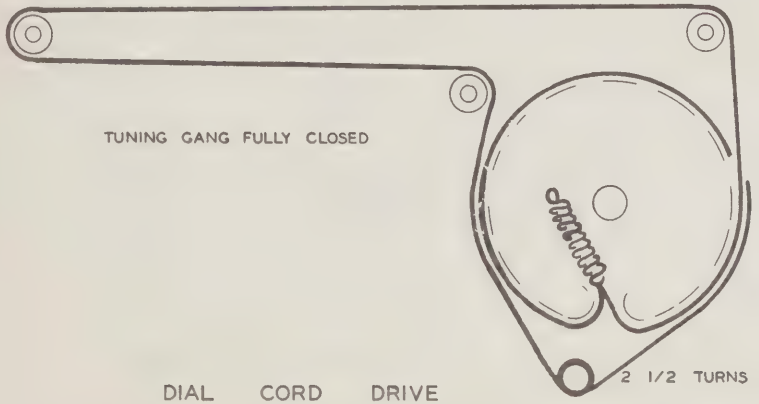
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: CLARION PART No.		INSTALLATION NOTES
42	Bayonet	6-8	0.15	Brown			Type 47

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: CLARION PART No.	ASTATIC PART No.	REMARKS
43		L-70	L-70-Z Original Part

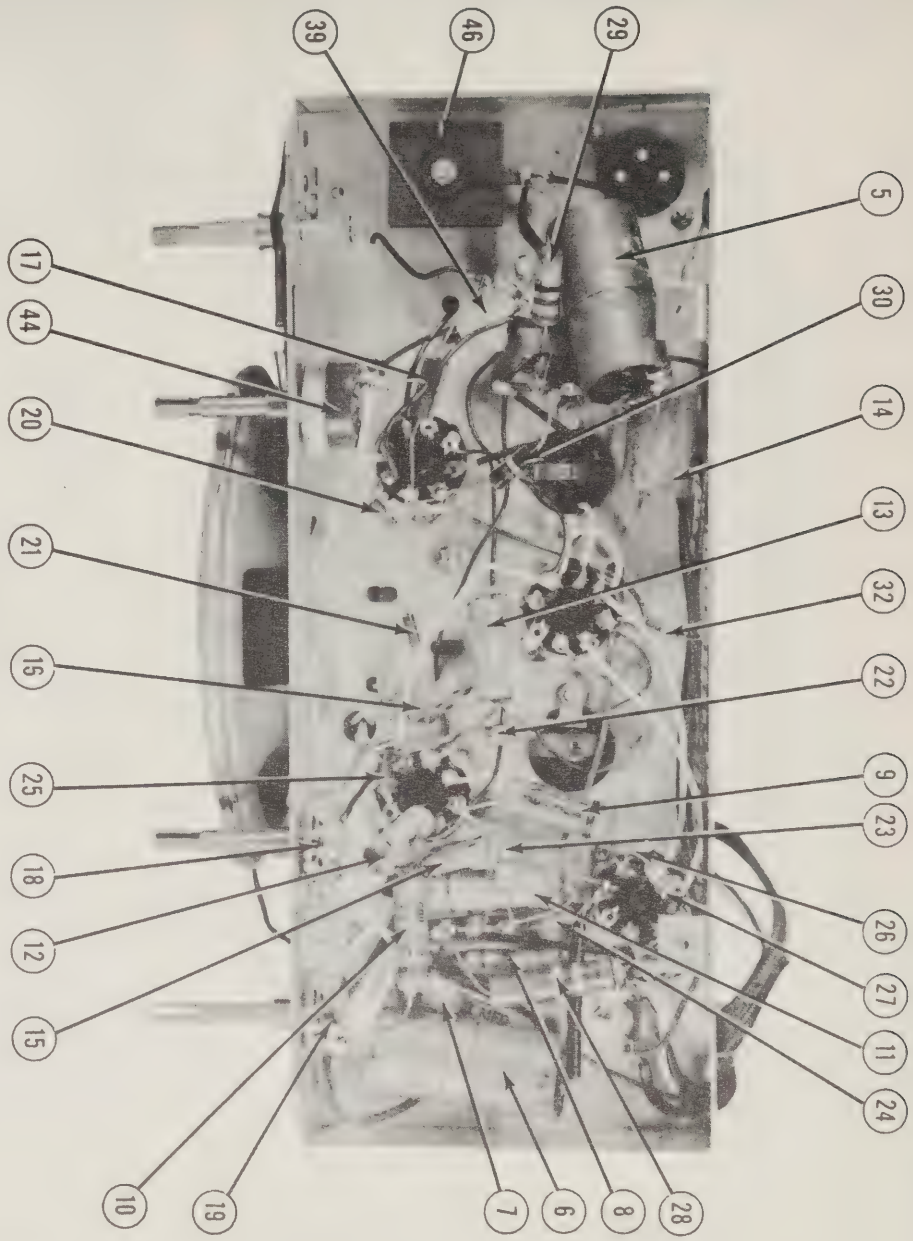
MISCELLANEOUS

ITEM No.	PART NAME	CLARION PART No.	NOTES
44	Switch	A69-169	On-Off
45	"	A69-172	Radio-Phono
46	Rectifier	A83-391	Selenium
47	2 Gang Var. Cap.	B19-193	(24-460MMF, 29-194MMF)
	Dial Scale	C67-502	
	Dial Pointer	A58-54	



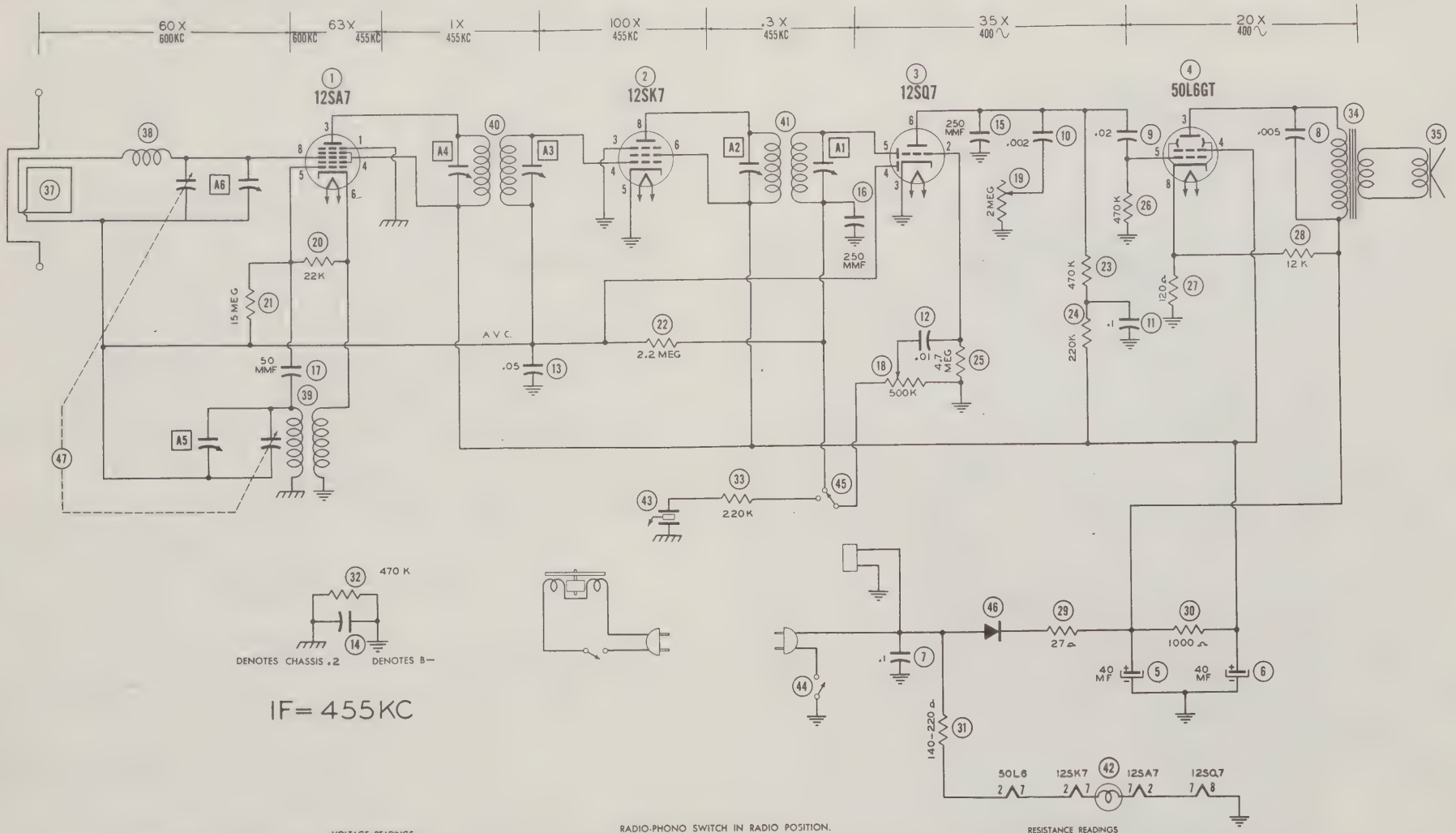
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



CLARION MODEL 1270G

CLARION MODEL 1270G



VOLTAGE READINGS

RADIO-PHONO SWITCH IN RADIO POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	11VAC	100VDC	100VDC	-17VDC§	0V.	23VAC	-.3VDC
2	12SK7	0V.	41VAC	0V.	-.8VDC	0V.	105VDC	23VAC	100VDC
3	12SQ7	0V.	-.8VDC	0V.	-.6VDC	-.3VDC	45VAC	11VAC	0V.
4	50L6	0V.	90VAC	120VDC	105VDC	0V.	0V.	41VAC	6.5VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	470KΩ	12Ω	12KΩ	12KΩ	22KΩ	1Ω	24Ω	2.7 Meg.
2	12SK7	470KΩ	40Ω	0Ω	2.7 Meg.	0Ω	12KΩ	20Ω	12KΩ
3	12SQ7	470KΩ	4.7 Meg.	0Ω	2.7 Meg.	500KΩ	480KΩ	12Ω	0Ω
4	50L6	INF.	90Ω	12KΩ	12KΩ	470KΩ	0Ω	40Ω	120Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITO THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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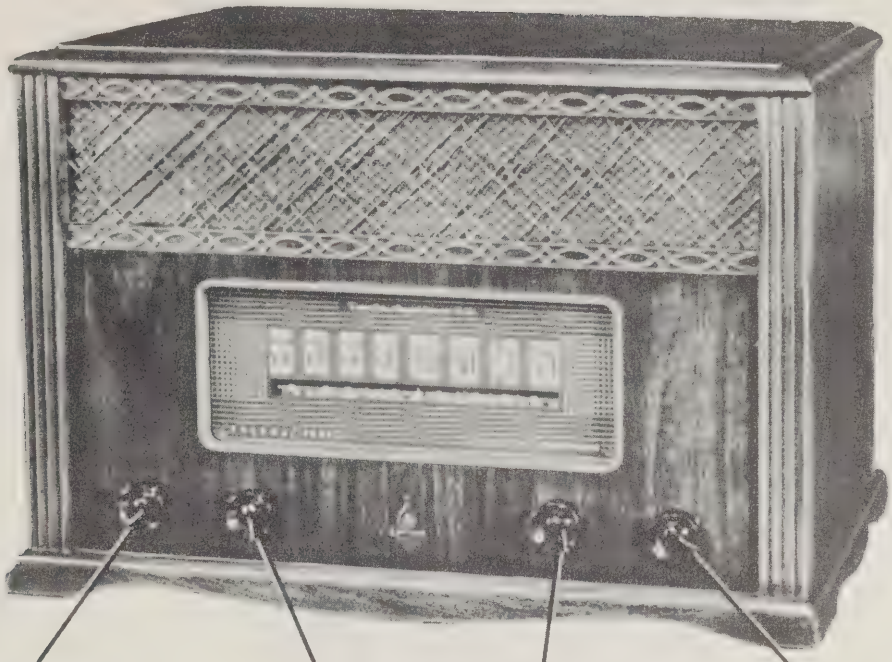
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

EMERSON MODEL 577B
(Ch. 120012B)



EMERSON MODEL 577B
(Ch. 120012B)

EMERSON MODEL 577B

TRADE NAME	Emerson, Model 577B (Ch. 120012B)
MANUFACTURER	Emerson Radio & Phono Corp., 111 8th Ave., New York, N.Y.
TYPE SET	AC Operated Superheterodyne Receiver with Loop Antenna
TUBES (EIGHT)	Types, 6SK7GT RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6SQ7 AF Amp., 6SQ7 Det.-AVC-Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1620KC RATING .75 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	200MMFD	High side to ext. ant. lead. Low side to chassis.	"	Tuning cap. fully closed.	"	A5	Adjust for minimum output.
3	200MMFD	"	1620KC	Tuning cap. fully open.	"	A6	Adjust for maximum output.
4	200MMFD	"	1400KC	Tune for maximum output.	"	A7	" " " "

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7GT	6SK7GT	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	AF Amp.	6SQ7	6SQ7	8Q	
5	Det.-AVC-Ph.Inv.	6SQ7	6SQ7	8Q	
6	Power Output	6V6GT	6V6GT	7AC	
7	" "	6V6GT	6V6GT	7AC	
8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: EMERSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	16	450	925007	PRS450/16-16	BRD1845	DY-3x15-450	TU-1616	Filter-Red
B	16	450						" "
C	16	450		PRS450/16	BR1645		UT-16	" Blue
10	.01	400	922020	484-01	DT4S1	MPH-4-01	TC-11	Line Filter
11	.003	600	920542	684-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
12	.05	400	920539	484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
13	.05	400	920539	484-05	DT4S5	ST-4-05	TC-15	" "
14	.1	400	920250	484-01	DT4P1	ST-4-1	TC-1	AF Plate Decoupling
15	.02	400	920020	484-02	DT4S2	ST-4-02	TC-12	Tone Compensation
16	.002	600	920010	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
17	.05	400	920539	484-05	DT4S5	ST-4-05	TC-15	Tone Compensation
18	.1	200	920040	484-.1	DT2P1	ST-2-1	TC-1	AVC Filter
19	.05	400	920539	484-05	DT4S5	ST-4-05	TC-15	Decoupling
20	.05	400	920539	484-05	DT4S5	ST-4-05	TC-15	RF Screen Bypass
21	220	300	910000	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass -Cer.
22	220	300	910000	1468-00025	5W5T25	MO.5-325	1FM-325	Tone Compensation "
23	110	500	910010	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
24	220	300	910000	1468-00025	5W5T25	MO.5-325	1FM-325	RF Coupling-Cer.
25	50	500	910250	1468-00005	5W5Q5	MO.5-45	1FM-45	" "
26	4.7	500	923004	1468-000005	5R5V5	MO5.5-55	MS-55	Fixed Trimmer

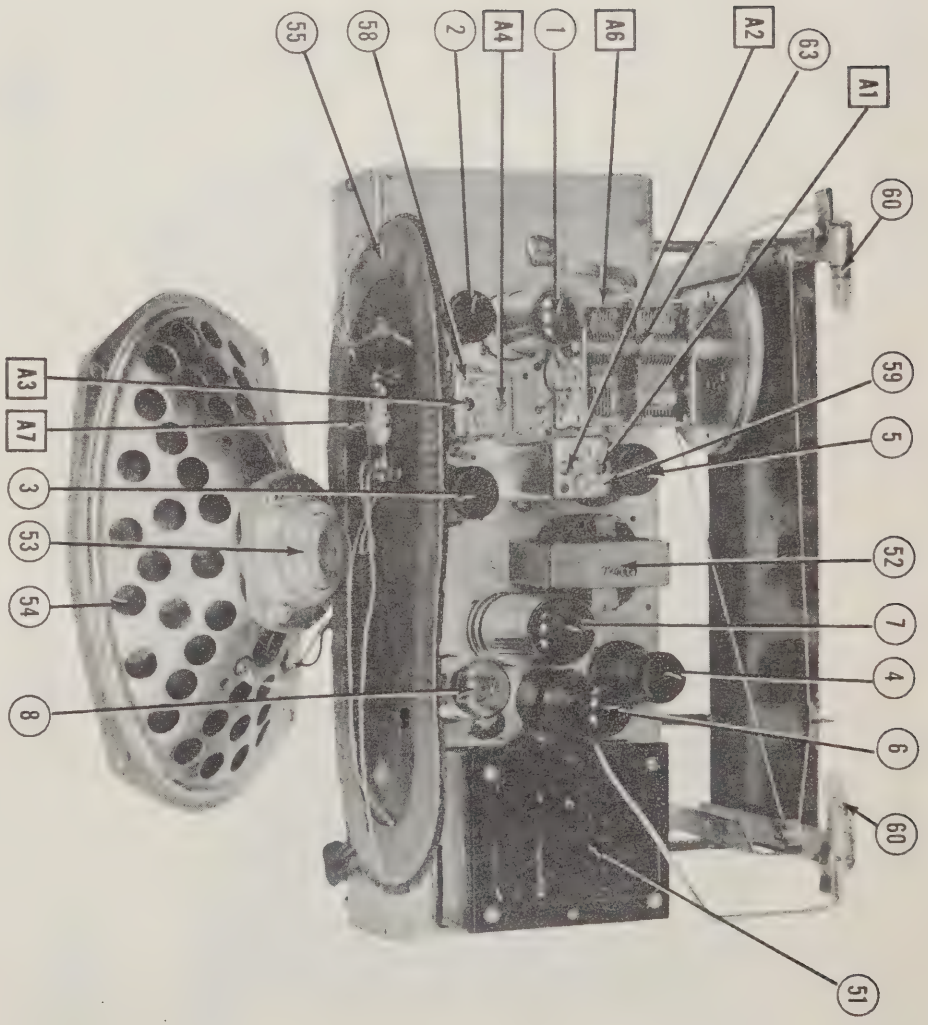
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
27A	500KΩ	½	390006	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 27A per instructions
C	Switch		" "	41	SW-A	" " " " "
28A	400KΩ	½	390007	D13-133	AM-60-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 28A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	IDENTIFICATION CODES
29	470KΩ	½	351130	BTS-470K	Yl.-V1.-Yl. RF Grid
30	47KΩ	½	340890	BTS-47K	Yl.-V1.-Or. RF Screen
31	10KΩ	½	340730	BTS-10K	Br.-Blk.-Or. RF Plate Load
32	220KΩ	½	351050	BTS-220K	Red-Red-Yl. Converter Grid
33	22KΩ	½	340810	BTS-22K	Red-Red-Or. Osc. Grid
34	1200Ω	½	340510	BTS-1200	Br.-Red-Red Decoupling
35	15 Meg.	½	397000	BTS-15 Meg.	Br.-Grn.-Blue AVC Network
36	2.2 Meg.	½	351290	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
37	4700Ω	½	350650	BTS-4700	Yl.-V1.-Red Tone Compensation
38	15 Meg.	½	397000	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
39	82Ω	½	340230	BW-½-82	Gray-Red-Blk. AF Cathode
40	470KΩ	½	351130	BTS-470K	Yl.-V1.-Yl. AF Plate Load
41	180KΩ	½		BTS-180K	Br.-Gray-Yl. AF Plate Decoupling
42	220KΩ	½	351050	BTS-220K	Red-Red-Yl. Phase Inv. Grid
43	220KΩ	½	351050	BTS-220K	Red-Red-Yl. Phase Inv. Plate Load

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	
44	220KΩ	½	351050	BTS-220K	Red-Red-Yl. Output Grid
45	220KΩ	½	351050	BTS-220K	Red-Red-Yl. Output Grid
46	180Ω	2	394140	BW-2-180	Br.-Gray-Br. Output Cathode
47	10Ω	½	340010	BW-½-10	Br.-Blk.-Blk. Output Cathode
48	820Ω	½	340470	BTS-820	Gray-Red-Br. Feedback
49	6800Ω	5	394002	AB-7000	Filter
50	560Ω	2	397001	BT-2-560	Grn.-Blue-Br. "

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	EMERSON PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
51	117V AC @ .75A	600V CT @ .117A	5.1V AC @ 2.0A	6.4V AC @ 2.95A	730008	P-6013*♯	T-22R05♯	P-2953*

*Add series resistor to reduce plate voltage.
♯Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE PRI.	IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.	EMERSON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
52	10,500 Ω CT	4Ω	325Ω CT	.8Ω	734005	A-3831♯	T22S57	A-2936♯	♯Drill one new mounting hole

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			EMERSON PART No.	JENSEN PART No.	QUAM PART No.	
53	FIELD	VC IMP.	180037		6SA3	
	PM	4Ω				
	CONE DIA.	VC DIA.				
54	6"x9"	1"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	EMERSON PART No.	MEISSNER PART No.
55	Loop Ant.		1.5Ω	700026	
56	Wave Trap		60Ω	708060	
57	Osc. Coil	1Ω	6.8Ω	716050	14-1040
58	1st IF	21Ω	21Ω	720532	16-6666
59	2nd IF	31Ω		720533	16-6670

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					EMERSON PART No.		
60	Bayonet	6-8	0.25	Blue	807020		Type 44
61	"	6-8	0.25	"	807020		" "

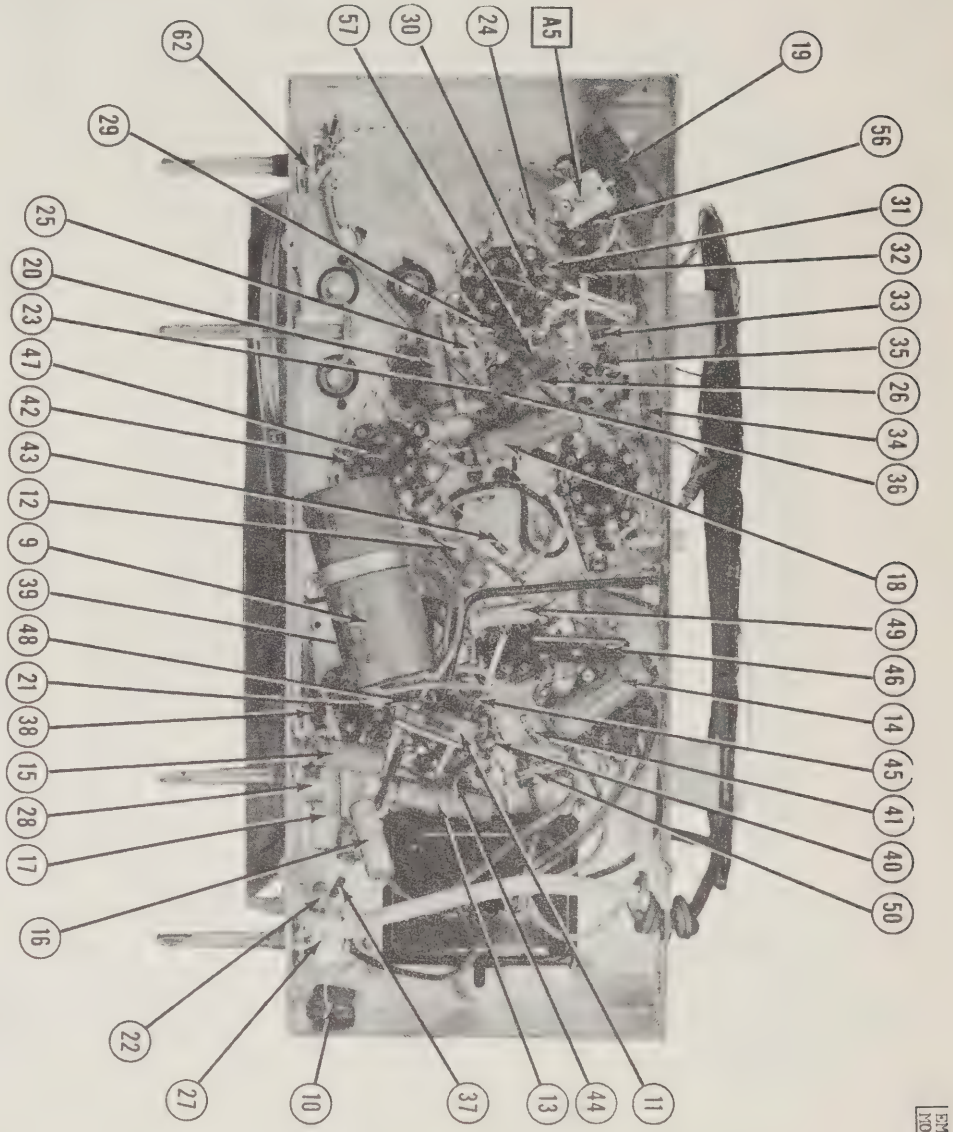
MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
62	Switch	510002	Radio-Phono
63	2 Gang Var.Cap.	900008	(16-476MMF, 30-203MMF)
	Dial Scale	520066	Glass
	Dial Pointer	525027	
	Knob	460470	
	Cabinet	140148	

DATE 5/48-#4811-6

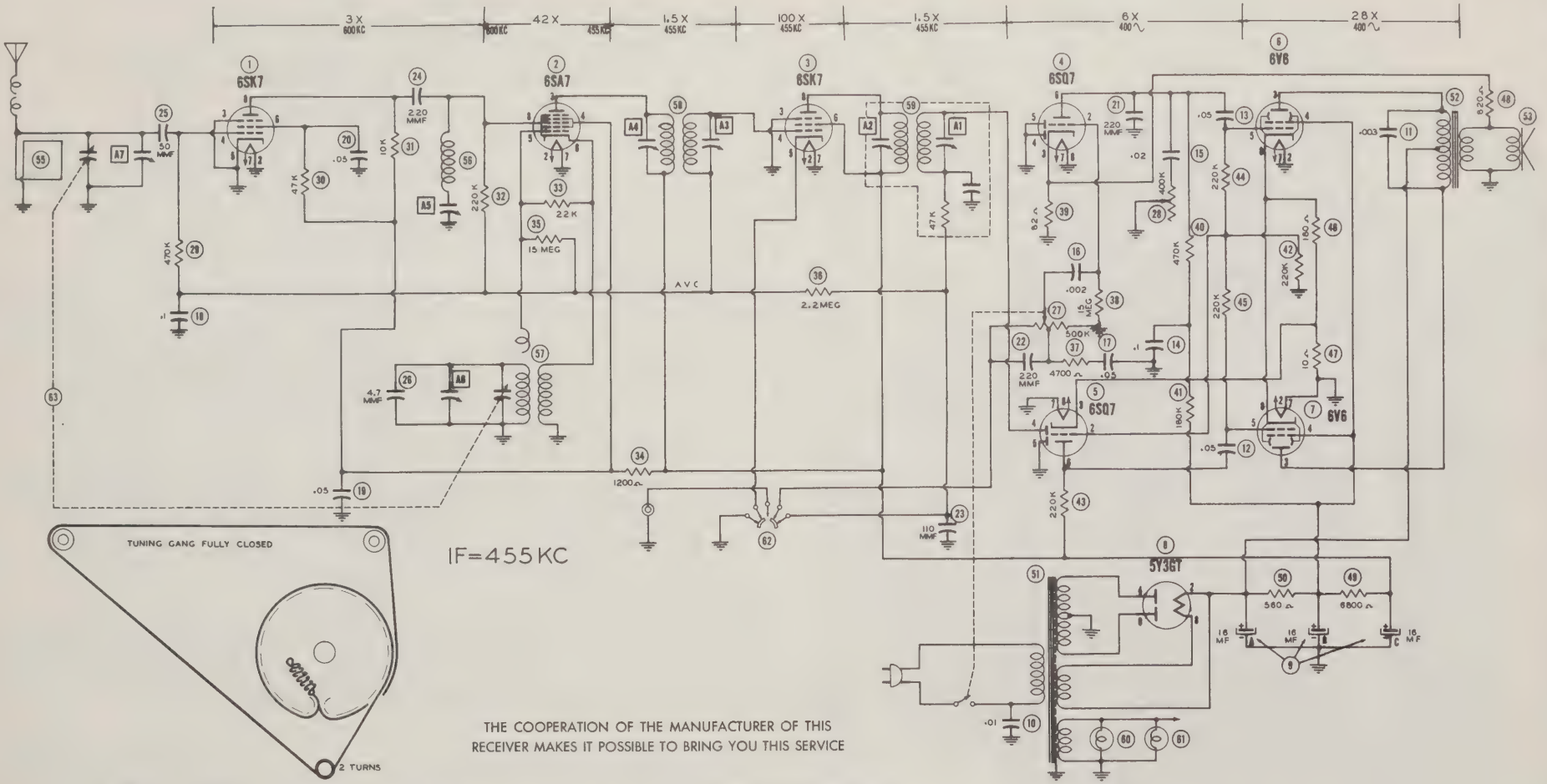
SET #41-FOLDER #6

CHASSIS—BOTTOM VIEW



EMERSON MODEL 577B

EMERSON MODEL 577B



RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7GT	0V.	0V.	0V.	-.6VDC	0V.	46VDC	6.4VAC	80VDC
2	6SA7	0V.	6.4VAC	100VDC	85VDC	-11V.DC§	0V.	0V.	-.8VDC
3	6SK7	0V.	6.4VAC	0V.	-.5VDC	0V.	100VDC	0V.	100VDC
4	6SQ7	0V.	-.8VDC	0V.	0V.	0V.	85VDC	6.4VAC	0V.
5	6SQ7	0V.	0V.	.2VDC	-.1VDC	0V.	80VDC	0V.	6.4VAC
6	6V6GT	0V.	0V.	250VDC	280VDC	0V.	0V.	6.4VAC	16VDC
7	6V6GT	0V.	6.4VAC	250VDC	280VDC	0V.	100VDC	0V.	16VDC
8	5Y3GT	0V.	280VDC	280VDC	300VAC	0V.	300VAC	75VAC	300VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7GT	0Ω	0Ω	0Ω	3.1 Meg.	0Ω	200KΩ	.1Ω	170KΩ
2	6SA7	0Ω	.1Ω	160KΩ	160KΩ	22KΩ	1Ω	0Ω	2.7 Meg.
3	6SK7	0Ω	.1Ω	0Ω	2.5 Meg.	0Ω	160KΩ	0Ω	160KΩ
4	6SQ7	0Ω	15 Meg.	82Ω	0Ω	0Ω	800KΩ	.1Ω	0Ω
5	6SQ7	0Ω	220KΩ	10Ω	550KΩ	0Ω	370KΩ	0Ω	.1Ω
6	6V6GT	0Ω	0Ω	150KΩ	150KΩ	440KΩ	220KΩ	.1Ω	1ΩΩ
7	6V6GT	0Ω	.1Ω	150KΩ	150KΩ	440KΩ	160KΩ	0Ω	180Ω
8	5Y3GT	INF.	150KΩ	350KΩ	87Ω	10Ω	60Ω	INF	150KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4811-6

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FIRESTONE (AIR CHIEF) MODEL
4-A-11 (Code #188-8-4A11)

FIRESTONE (AIR CHIEF) MODEL
4-A-11 (Code #188-8-4A11)

AIR CHIEF MODEL 4-A-11

TRADE NAME	Air Chief, Model 4-A-11 (Code 188-8-4A11)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12BA6 RF Amp., 12BE6 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1600KC RATING .31 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.02 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	250MMFD.	High side to ext. ant. terminal. Low side to B-.	1620KC	"	"	A5	Adjust for maximum output.
3	250MMFD.	"	1400KC	Tune for maximum output.	"	A6	Rock tuning cap. & adjust for maximum output.

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DATE 5/48-#4811-7 SET #41-FOLDER #7

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIR CHIEF PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12SA8	12SA8	7EK	
2	Converter	12BE6	12BE6	7CH	
3	IF Amp.	12SK7	12SK7	8N	
4	Det.-AVC-AF	12SQ7	12SQ7	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	5AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIR CHIEF PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	50	150	RCE-050	PRSA150/40-40	EZ5515	DSB-2X50-150	TA-505	Filter
B	50	150					"	"
8	.05	600	UCC-045	684-05	DT6S5	ST-6-05	TC-15	Line Filter
9	.01	600	UCC-040	684-01	DT6S1	ST-6-01	TC-11	Output Plate Bypass
10	.01	400	UCC-040	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
11	.005	400	UCC-022	484-005	DT6D5	ST-6-005	TC-25	" "
12	.05	400	UCC-028	484-005	DT4S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
13	.05	400	UCC-028	484-005	DT4S5	ST-4-05	TC-15	AVC Filter
14	.01	400	UCC-040	484-01	DT4S1	ST-4-01	TC-11	Ext. Ant. Coupling
15	.01	400	UCC-040	484-01	DT4S1	ST-4-01	TC-11	Tuning Cap. Isolation
16	.1	400	UCC-030	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
17	330		UCU-040	1468-00035	5W5T35	MO.5-335	1FM-335	AF Plate Bypass
18	330		UCU-040	1468-00035	5W5T35	MO.5-335	1FM-335	Diode RF Filter
19	100		UCU-028	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR CHIEF PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20A	500KΩ	½	RRC-063	D13-133	AM-60-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 20A per instructions
C	Switch		" "	41	SW-A	" " " " "

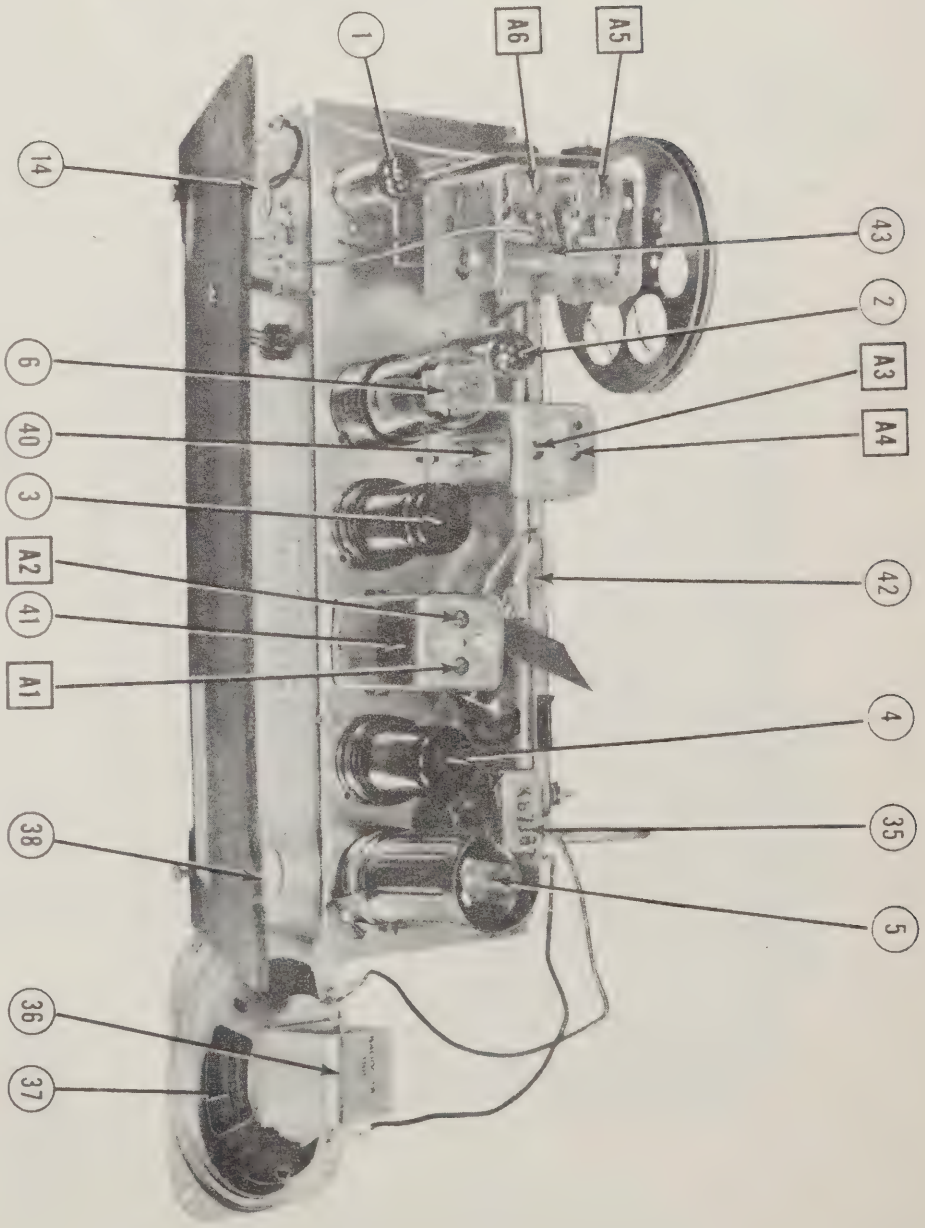
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR CHIEF PART No.	IRC PART No.	IDENTIFICATION CODES
21	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Line Isolation
22	150Ω	½	URD-029	BW-½-150	Br.-Grn.-Br. RF Cathode
23	4700Ω	½	URD-065	BTS-4700	Yl.-Vi.-Red RF Plate Load
24	22KΩ	½	URD-081	BTS-22K	Red-Red-Or. Converter Grid
25	22KΩ	½	URD-081	BTS-22K	Red-Red-Or. Oscillator Grid
26	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
27	4.7 Meg.	½	URD-137	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
28	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
29	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Output Grid
30	150Ω	½	URD-029	BW-½-150	Br.-Grn.-Br. Output Cathode
31	1500Ω	2	URF-053	BT-2-1500	Br.-Grn.-Red Filter
32	22Ω	1	URE-009	BW-1-22	Red-Red-Blk. Line Dropping
33	22Ω	½	URD-089	BW-½-22	Red-Red-Blk. Rectifier Ballast
34	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. IF Transformer Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIR CHIEF PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
35	2400Ω	3.9Ω	130Ω	.7Ω	RTO-039	A-3376	T22S45	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIR CHIEF PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
36	FIELD PM	VC IMP. 3.2Ω	UOP-420	ST-113 Mod. P4-A	4A07	
37	CONE DIA. 4"	VC DIA. 1/2"				

R F COILS

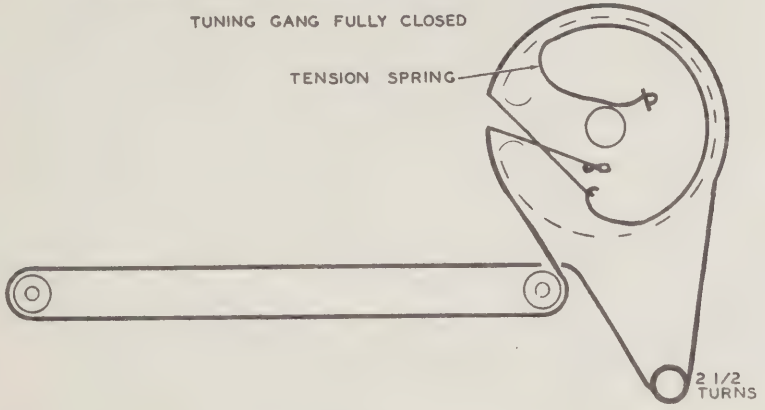
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIR CHIEF PART No.	MEISSNER PART No.	
38	Loop Ant.	.1Ω	1.6Ω	RAB-064		
39	Osc. Coil		5.8Ω	RLC-058	14-1060	Add 50MMFD cap. from high side tuning cap. to osc. grid
40	1st IF	18.2Ω	18.2Ω	RTL-075	16-6658	
41	2nd IF	22.7Ω	23.7Ω	RTL-076	16-6660	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIR CHIEF PART No.		INSTALLATION NOTES
42	Screw	120					Type C7

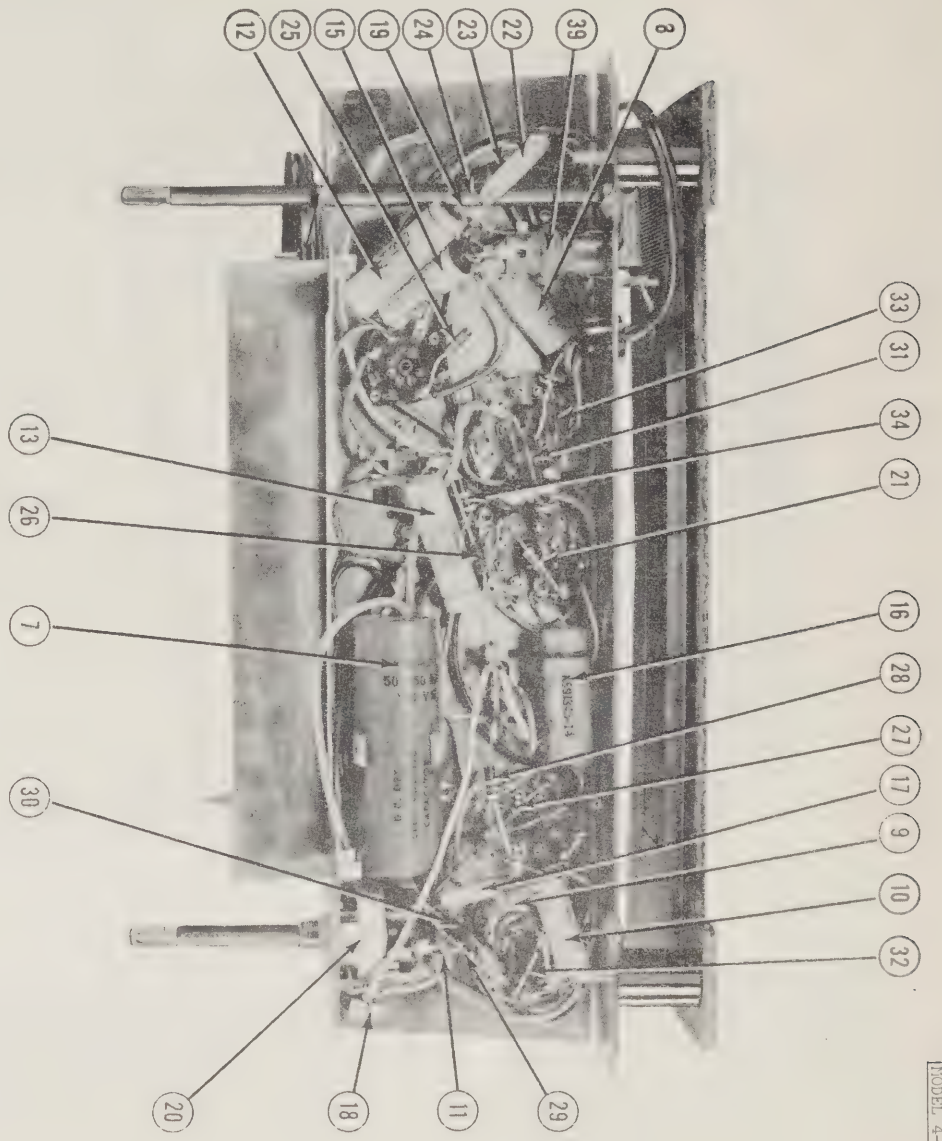
MISCELLANEOUS

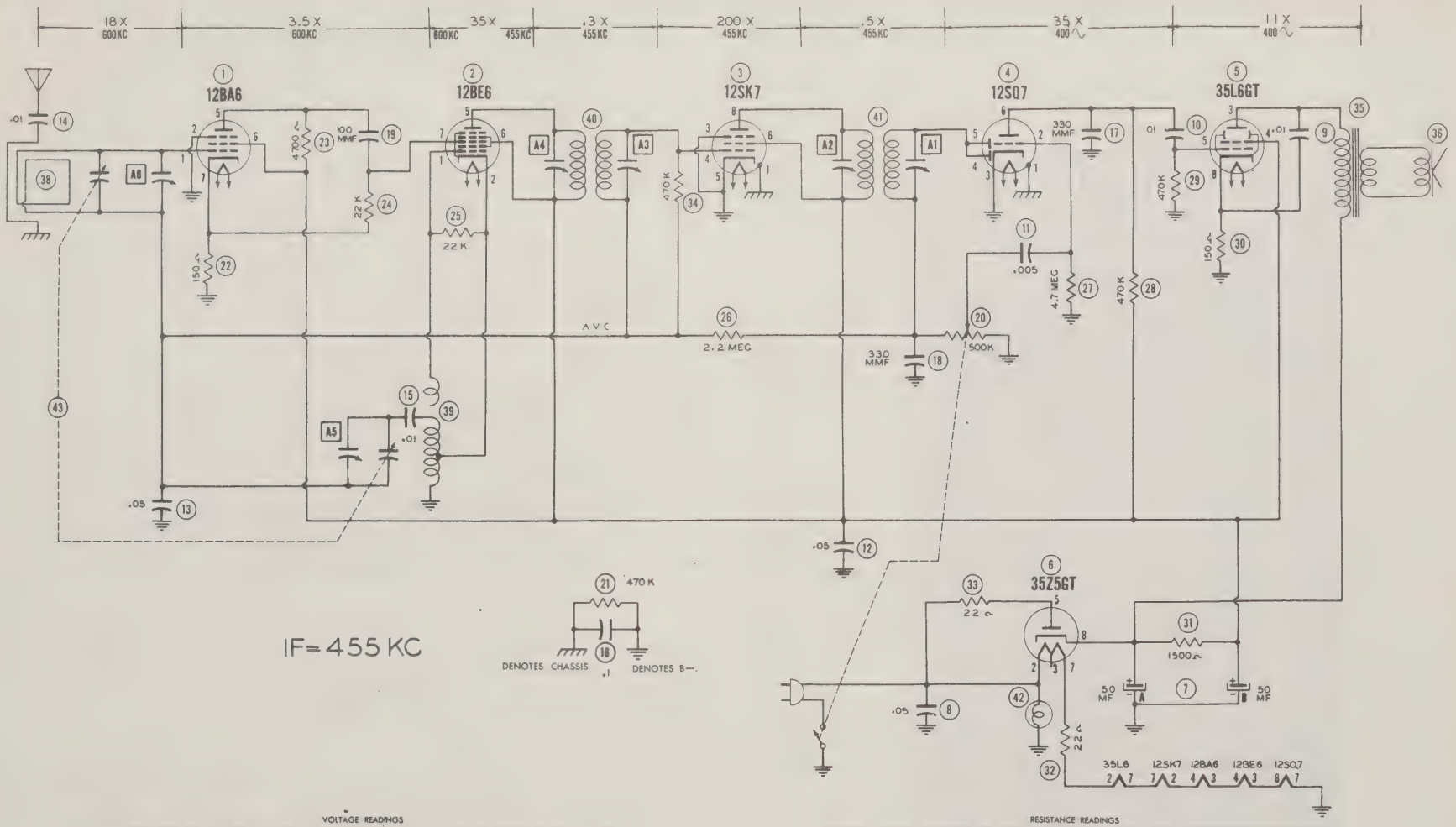
ITEM No.	PART NAME	AIR CHIEF PART No.	NOTES
43	2 Gang Var. Cap	RCT-027	(40-40MMF, 40-200MMF)
	Dial Scale	RDS-057	
	Dial Pointer	ROP-037	
	Knob	ROK-115	
	Cabinet	RAU-027	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





IF = 455 KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BA6	-.5VDC	0V.	25VAC	37VAC	60VDC	82VDC	1VDC	-
2	12BE6	-9VDC§	0V.	13VAC	25VAC	82VDC	92VDC	.4VDC	-
3	12SK7	0V.	37VAC	0V.	-.5VDC	0V.	82VDC	4.4VAC	82VDC
4	12SQ7	0V.	-.7VDC	0V.	-.6VDC	-.6VDC	43VDC	0V.	13VAC
5	35L6GT	0V.	89VAC	122VDC	-2VDC	0V.	91VAC	44VAC	4.4VDC
6	35Z5GT	0V.	117VAC	110VAC	0V.	115VAC	117VAC	61VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12BA6	2.7 Meg.	0Ω	32Ω	32Ω	56KΩ	52KΩ	150Ω	-
2	12BE6	22KΩ	0Ω	12Ω	22Ω	52KΩ	52KΩ	22KΩ	-
3	12SK7	470KΩ	32Ω	0Ω	2.7 Meg.	0Ω	52KΩ	40Ω	52KΩ
4	12SQ7	470KΩ	4.7 Meg	0Ω	500KΩ	500KΩ	520KΩ	0Ω	12Ω
5	35L6GT	INF.	60Ω	50KΩ	52KΩ	470KΩ	75Ω	40Ω	150Ω
6	35Z5GT	INF.	90Ω	32Ω	0Ω	112Ω	90Ω	75Ω	50KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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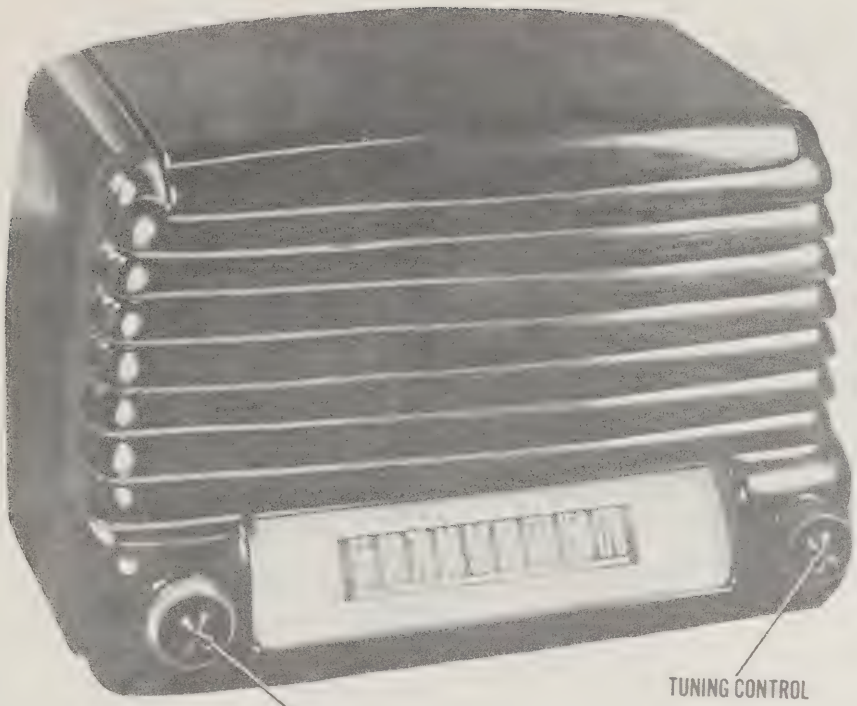
4811-7

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**

GENERAL ELECTRIC MODELS 102, 102W, 107, 107W, 114, 114W, 115, 115W



GENERAL ELECTRIC MODELS 102, 102W, 107, 107W, 114, 114W, 115, 115W

GENERAL ELECTRIC MODEL 107

TRADE NAME	General Electric, Model 102, 102W, 107, 107W, 114, 114W, 115, 115W
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Ant.
TUBES (FIVE)	Types, 12SA7 Corverter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .24 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Standard dummy in Steps 2 & 3 below consists of 200MMFD cap. in series with 20 microhenry choke shunted by 400MMFD cap. in series with 400Ω carbon resistor.
Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	Standard Dummy (See preceding notes)	Across loop primary terminals.	1720KC	"	"	A5	Adjust for maximum output.
3	"	"	1500KC	Tune for maximum output.	"	A6	" " " "

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DATE 5/48-#4811-8 SET #41-FOLDER

PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC
MODEL 107

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GEN. ELECTRIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GEN. ELECTRIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150	SCE-001	PRSA150/30-30	EZ3315	DSB-2x30-150	TA-330	Filter-Yl.
B	30	150						" -Red
7	.05	600	UCC-635	684-05	DT6S5	ST-6-05	TC-15	Line Filter
8	.05	400	UCC-635	484-05	DT4S5	ST-4-05	72P1	Line Isolation
9	.02	600	UCC-631	684-02	DT6S2	ST-6-02	TC-12	Output Plate Bypass
10	.01	600	UCC-630	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
11	.005	600	UCC-625	684-005	DT6D5	ST-6-005	TC-25	" "
12	.02	400	UCC-631	484-02	DT4S2	ST-4-02	TC-12	Tuning Cap.
13	.05	400	UCC-635	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
14	330	300	UCU-040	1468-0003	5W5T3	MO.5-33	1FM-33	AF Plate Bypass-Cer.
15	330	300	UCU-040	1468-0003	5W5T3	MO.5-33	1FM-33	Diode RF Filter-Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GEN. ELECT. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	500KΩ	½	SRC-003	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 16A per instructions
C	Switch		" "	41	SW-A	" " " " "

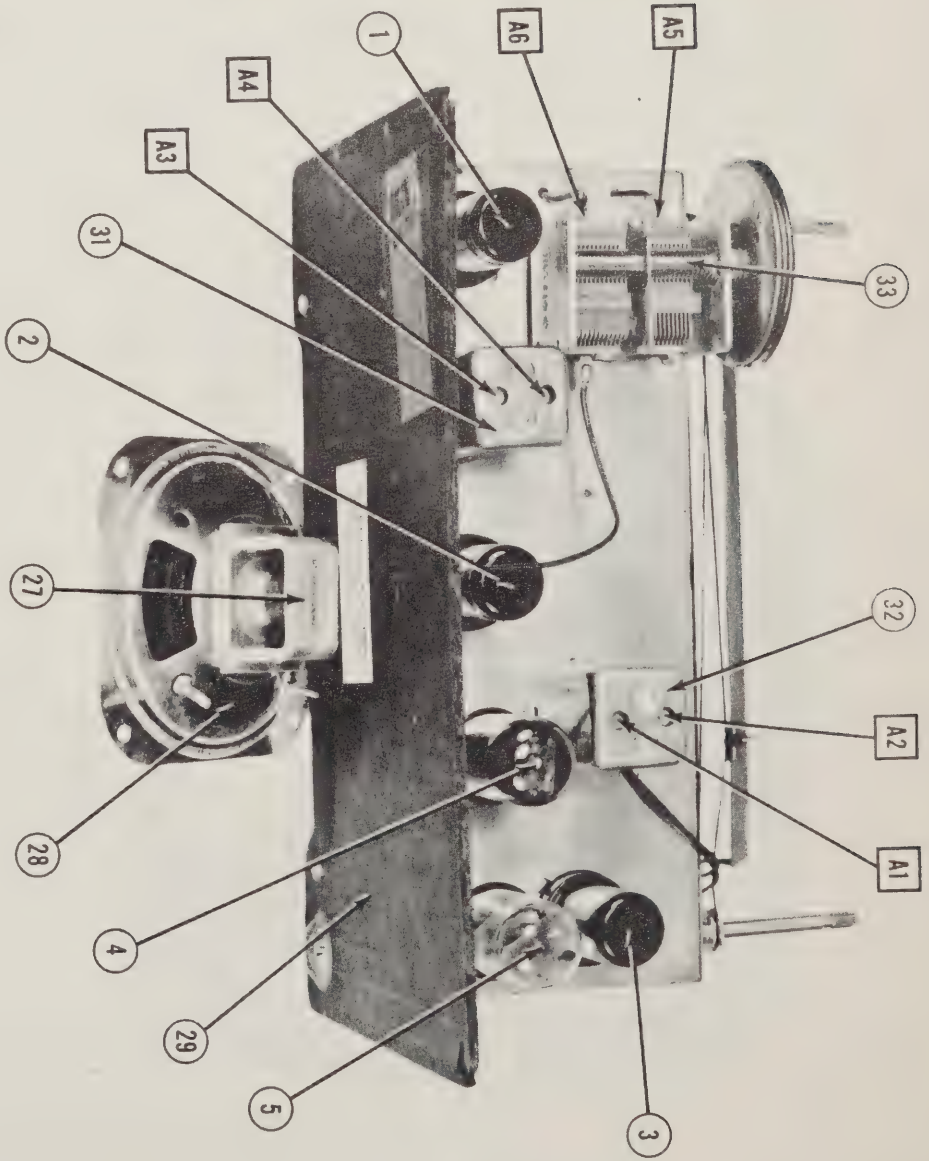
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	IRC PART No.	IDENTIFICATION CODES
17	22KΩ	½	URD-009	BTS-22K	Red-Red-Or. Osc. Grid
18	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
19	4.7 Meg.	½	URD-137	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
20	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
21	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Output Grid
22	150Ω	½	URD-029	BW-½-150	Br.-Grn.-Br. Output Cathode
23	2200Ω	2		BT-2-2200	Red-Red-Red Filter
24	22Ω	½	URD-009	BW-½-22	Red-Red-Blk. Rectifier Bypass
25	470KΩ	½	URD-113	BTS-470K	Yl.-Vi.-Yl. Line Isolation

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
26	7000Ω	3.8Ω	132Ω	.4Ω	ST0-005	A-3876	T22S45	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

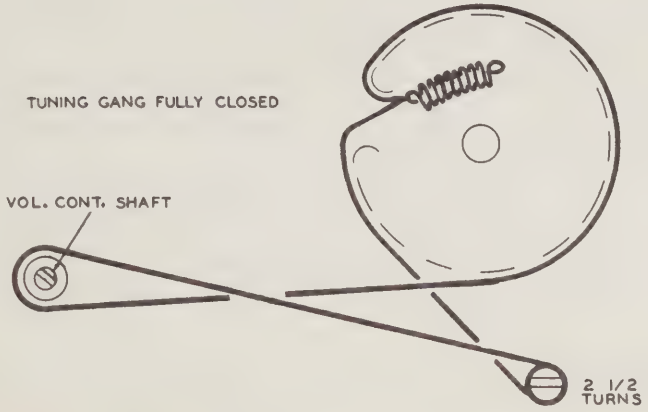
ITEM No.	RATINGS		REPLACEMENT DATA: GENERAL ELECTRIC PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113		
27	PM	3.6Ω	U0P-487	Mod. P4-X	4A07	
	CONE DIA.	VC DIA.				
28	4"	1/2"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	MEISSNER PART No.	
29	Loop Ant.		2.8Ω	RAB-070		
30	Osc. Coil		9.3Ω	SLC-020	14-1060	Add 50MMF.from high side tuning cap. to osc. grid.
31	Input IF	20Ω	19Ω	STL-007	16-6658	
32	Output IF	30Ω	30Ω	STL-008	16-6660	

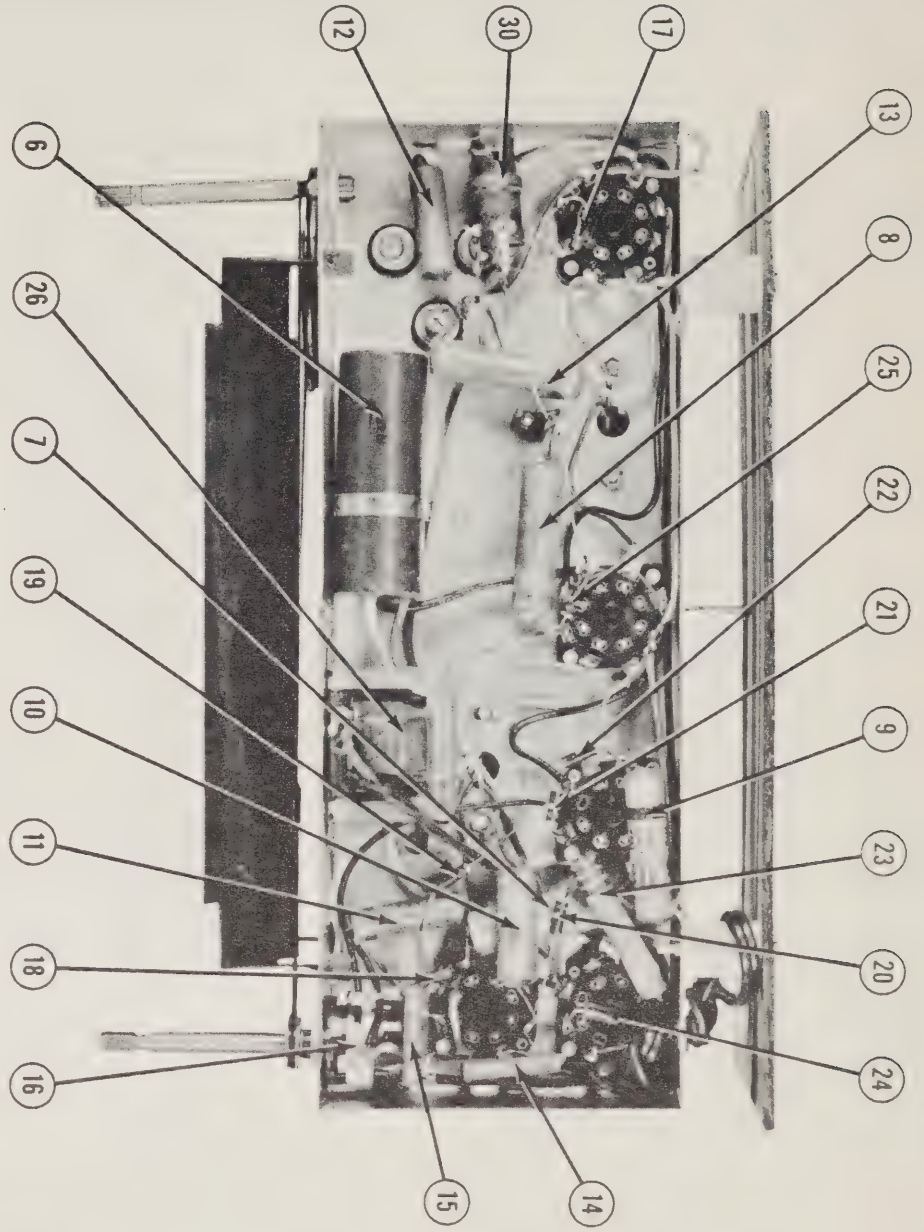
MISCELLANEOUS

ITEM No.	PART NAME	GENERAL ELECTRIC PART No.	NOTES
33	2 Gang Var. Cap	RCT-029	(23-465MMF, 30-195MMF)
	Dial Pointer	SDP-001	
	Dial Scale	SDS-019	Models 102, 102W, 107, 107W, 114, 114W
	" "	RDS-063	Models 115, 115W

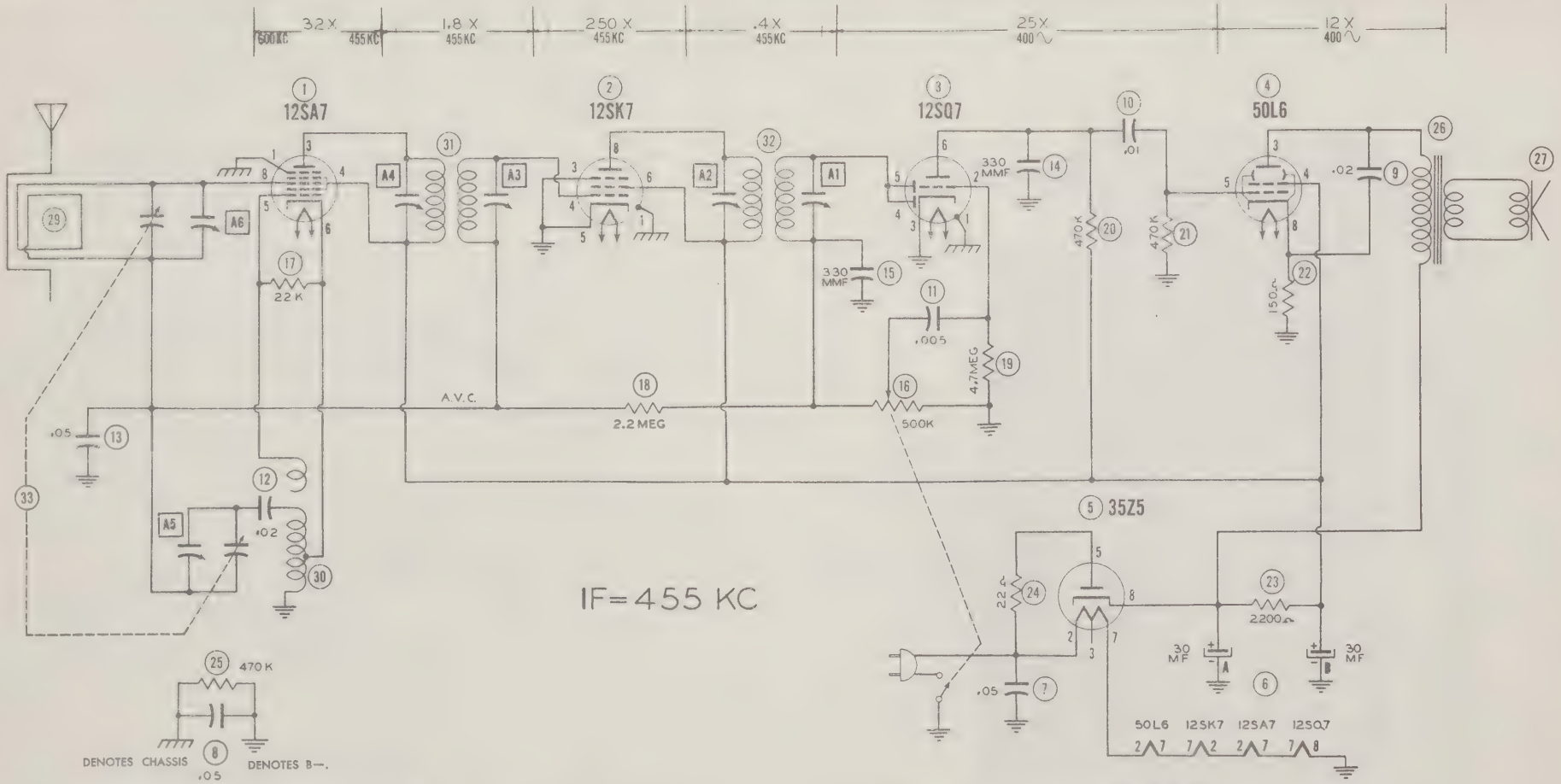


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



GENERAL ELECTRIC MODEL 107



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	27VAC	95VDC	95VDC	-1.7VDC§	0V.	1.2VAC	-1.6VDC
2	12SK7	0V.	2.3VAC	0V.	-1.6VDC	0V.	95VDC	38VAC	95VDC
3	12SQ7	0V.	-1.7VDC	0V.	-1.4VDC	-1.4VDC	41VDC	1.2VAC	0V.
4	50L6GT	0V.	117VAC	1.4VDC	95VDC	0V.	0V.	38VAC	-1.4VDC
5	35Z5GT	0V.	117VAC	109VAC	117VAC	117VAC	-1.6VDC	94VDC	1.2VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	470KΩ	24Ω	67KΩ	67KΩ	1.2MΩ	.8Ω	1.2Ω	2.7 Meg.
2	12SK7	470KΩ	1.2MΩ	0Ω	2.7 Meg.	0Ω	67KΩ	36Ω	67KΩ
3	12SQ7	470KΩ	4.7 Meg.	0Ω	1.2MΩ	1.2MΩ	540KΩ	12Ω	0Ω
4	50L6GT	INF.	86Ω	65KΩ	67KΩ	470KΩ	0Ω	36Ω	150Ω
5	35Z5GT	INF.	11Ω	110Ω	118Ω	1.4MΩ	2.7 Meg.	94Ω	68KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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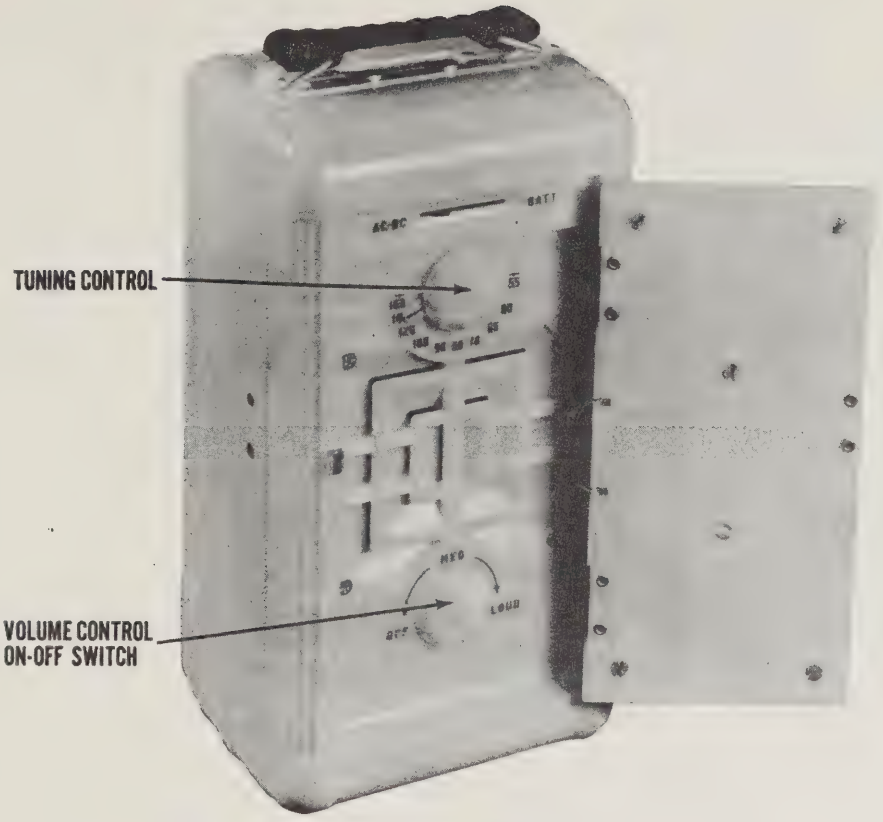
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

GLOBE MODEL 454
BATTERY-LINE OPERATED



GLOBE MODEL 454
BATTERY-LINE OPERATED

GLOBE MODEL 454

TRADE NAME	Globe, Model 454
MANUFACTURER	Globe Electronics Inc., 225 W. 17th St., New York, N.Y.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver
TUBES (FOUR)	Types, 1R5 Converter, 1L4 or 1T4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output.
POWER SUPPLY	110-120 Volts AC-DC or 1.5 Volt "A" Supply and 67.5 Volt "B" Supply
RATING	.23 Amp. @ 117 Volts AC or 240MA @ 1.5 Volts DC and 6.6MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to front stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200MMF. to reduce hum modulation.
2		Loop	1600KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 5/48-#4811-9 SET #41-FOLDER #9

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GLOBE PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R4	7AT	
2A	IF Amp.	1L4	1L4	6AR	
B	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	GLOBE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	45	150			UP4CJ62			■ Filter
B	20	150						▲ "
C	200	10						Filament Bypass
6A	.01	400		484-01	DT4S1	ST-4-01	TC-11	Line Filter-See Note 1
B	.05	400		484-05	DT4S1	ST-4-05	TC-15	Line Filter-See Note 2
7	.004	150			ZZW1D4	TTR-1.5-003		Output Plate Bypass
8	.004	150			ZZW1D4	TTR-1.5-003		Audio Coupling
9	.002	400			ZYW4D2			AF Screen Bypass
10A	.004	150			ZZW1D4	TTR-1.5-003		Audio Coupling-See Note 1
B	.002	150			ZYW4D2			Audio Coupling-See Note 2
11	.01	150			ZZW1S1	TTR-1.5-01		IF Grid Filter
12	.01	150			ZZW1S1	TTR-1.5-01		Screen Bypass
13	.04	400				TTF-1.5-1	F	AVC Filter
14	.1	150						Filament Bypass
15	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	AF Plate Bypass-See Note 1
16	150	500		1468-00001	5W5T15	MO.5-31	1FM-31	Osc. Grid Cap.-See Note 1
46A	250	500		1468-00025	5W5T25	MO.5-325	1FM-235	Diode RF Filter-See Note 1
B	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter-See Note 2

Note 1-Used in early productions.
Note 2-Used in later productions.

CONTROLS

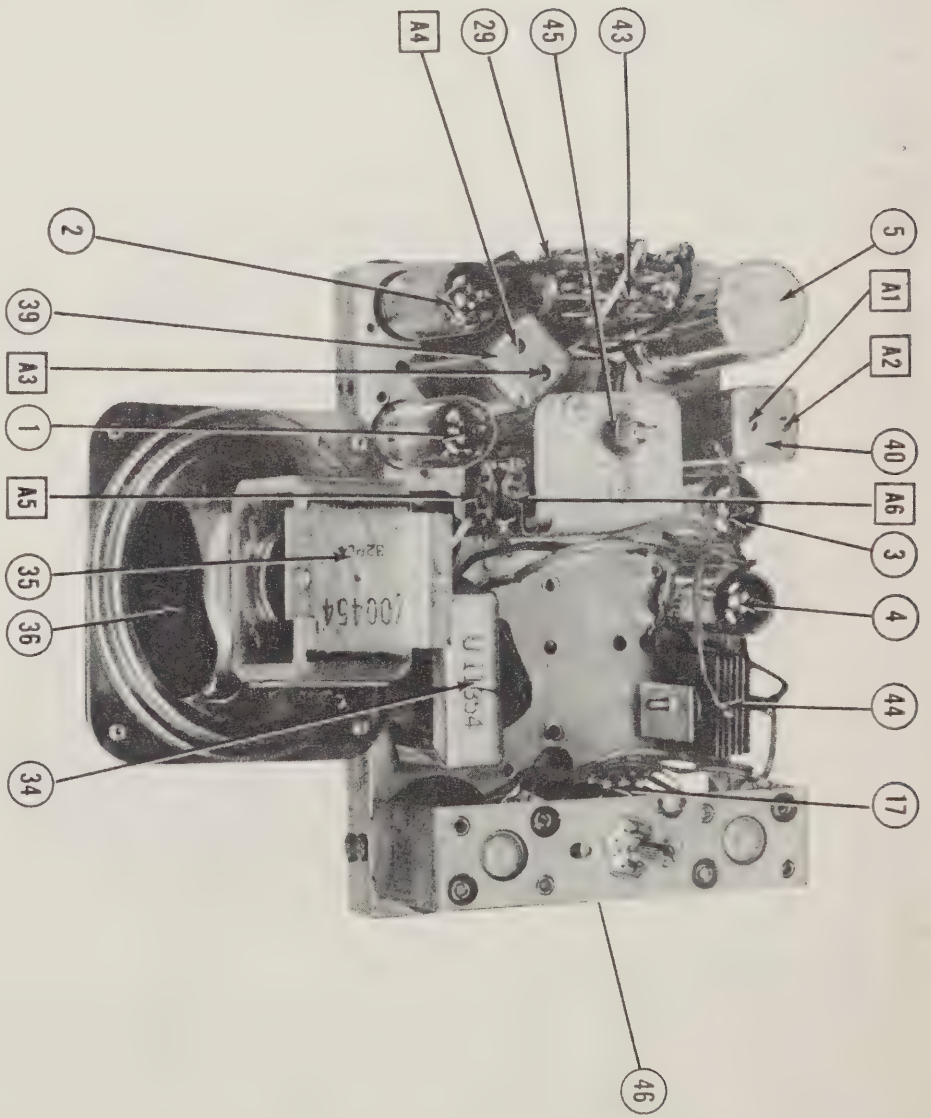
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GLOBE PART No.	IRC PART No.	CLAROSTAT PART No.	
17A	1 Meg.	½		D13-137	AM-63-2	Volume Control
B	Shaft			E	KSS-3	Attach to 17A per instructions
C	Switch			42	SW-A2	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GLOBE PART No.	IRC PART No.	
18	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Oscillator Grid
19	10KΩ	½		BTS-10K	Br.-Blk.-Or. Soreen Dropping
20	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. IF Transformer Shunt-See Note 3
21	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. IF Grid
22	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
23	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. " " -See Note 1
24	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
25	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen Dropping
26	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
27	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. Output Grid
28	820Ω	½		BTS-820	Gray-Red-Br. Filament String-See Note 3
29	820Ω	½		BTS-820	Gray-Red-Br. Bias-See Note 2
30	470Ω	½		BTS-470	Yl.-Vi.-Br. Filament String
31	2600Ω	10		AB-2500	" Dropping
32	820Ω	½		BTS-820	Gray-Red-Br. Bias Network
33	2700Ω	1		BTA-2700	Red-Vi.-Red Filter
47	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. Feedback

Note 1-Later production uses 10 Meg. in this application. IRC replacement BTS-10 Meg.
Note 2-Later production uses 330Ω in this application. IRC replacement BW-½-330.
Note 3-Not used in later productions.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		GLOBE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
34	7800Ω	2.8Ω	450Ω	.5Ω		A-3878*	T22847*	A-2931*	*Duplicate original mounting.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			GLOBE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
35	PM	2.8Ω			3A07†	†Fabricate new mounting bracket.
	CONE DIA.	VC DIA.				
36	3-3/8"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	GLOBE PART No.	MEISSNER PART No.
37	Loop Ant.		2.5Ω		
38	Osc. Coil	2Ω	5.2Ω		
39	Input IF	18Ω	18Ω		16-6668
40	Output IF	18Ω	18Ω		16-6669

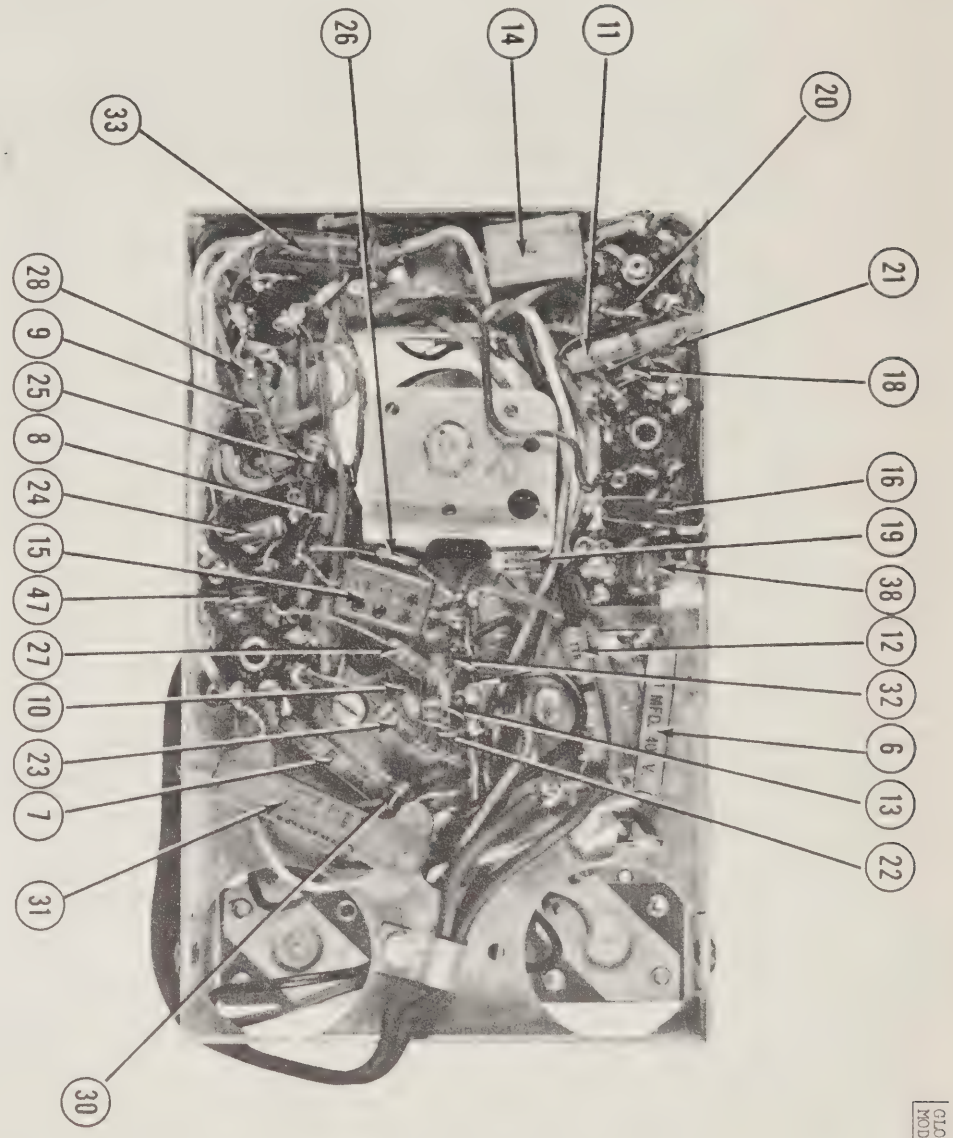
BATTERIES

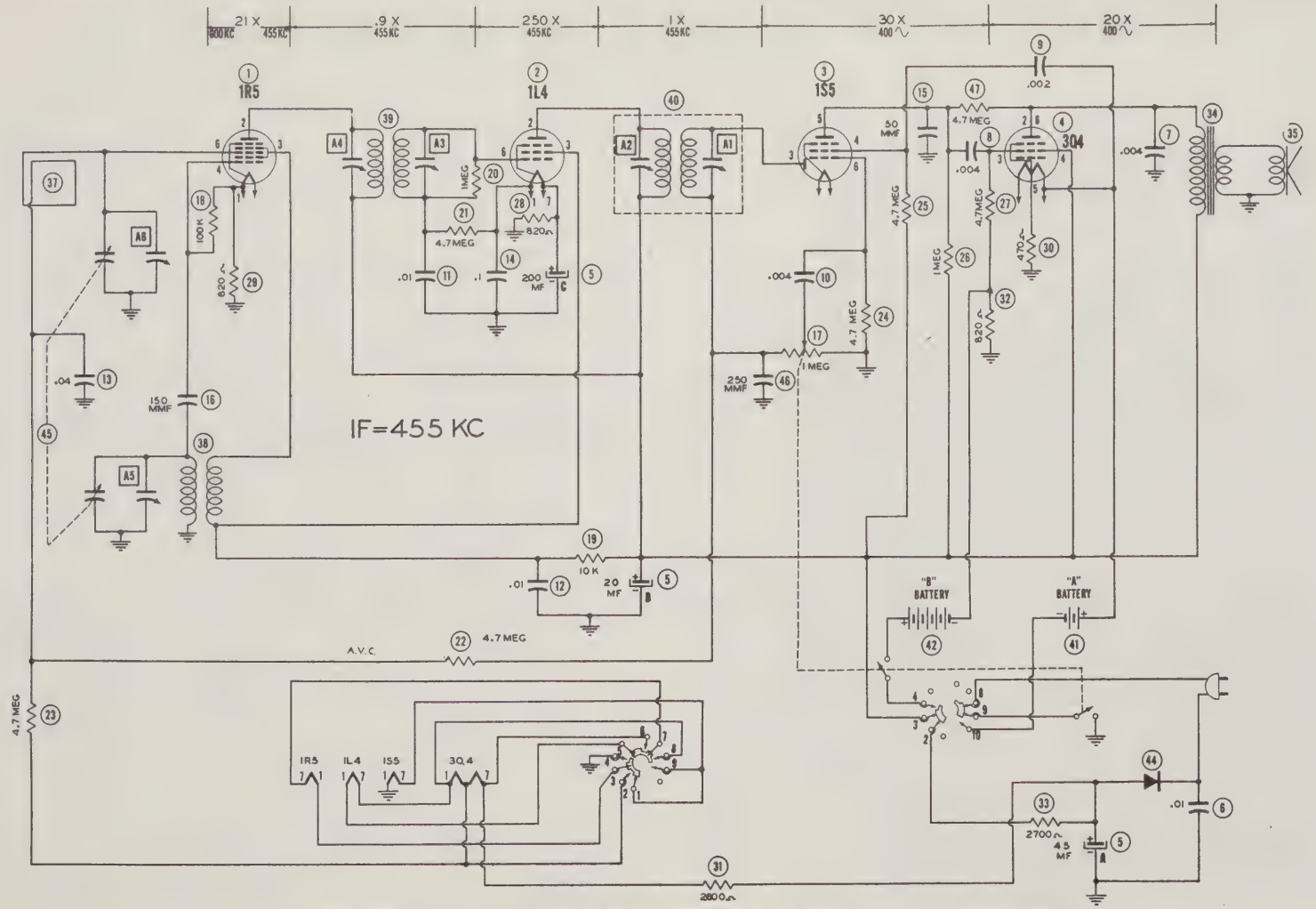
ITEM No.	VOLTAGE	GLOBE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
41	1.5V "A"		#950			2R			2 Used in Parallel
42	67.5V "B"			#467			XX-45		

MISCELLANEOUS

ITEM No.	PART NAME	GLOBE PART No.	NOTES
43	Switch		AC/DC-Batt.
44	Rectifier		Selenium
45	2 Gang Var. Cap		(2C-388MMF 27-155MMF)

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	1.5VDC	100VDC	65VDC	-19VDC§	1.5VDC	-.2VDC	3.1VDC
2	1L4	3.1VDC	100VDC	65VDC	0V.	3.1VDC	0V.	4.5VDC
3	1S5	0V.	0V.	0V.	14VDC	19VDC	0V.	1.5VDC
4	3Q4	4.5VDC	95VDC	0V.	100VDC	5.6VDC	95VDC	7.5VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	5KΩ	15KΩ	100KΩ	*	2.5 Meg.	*
2	1L4	*	5KΩ	15KΩ	5 Meg.	*	6 Meg.	*
3	1S5	*	INF.	1 Meg.	5 Meg.	1 Meg.	5 Meg.	*
4	3Q4	*	5KΩ	5 Meg.	5KΩ	*	5KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4811-9

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, by shorting AVC line to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

MAGNAVOX CHASSIS MODELS
AMP-108A, AMP-108B

TRADE NAME	Magnavox, Chassis Models AMP-108A, AMP-108B
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.
TYPE SET	AC Operated Audio Amplifier with Power Supply
TUBES (SIX)	Types, (4) 6L6 Power Output, (2) 5U4G Rectifier.
POWER SUPPLY	110-120 Volts AC RATING 2.1 Amp. @ 117 Volts AC

MAGNAVOX CHASSIS MODELS
AMP-108A, AMP-108B

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6L6	0V.	3.15VAC**	350VDC	285VDC	0V.	0V.	3.15VAC**	19VDC
2	6L6	0V.	3.15VAC**	350VDC	285VDC	0V.	0V.	3.15VAC**	19VDC
3	6L6	0V.	3.15VAC**	350VDC	285VDC	0V.	0V.	3.15VAC**	19VDC
4	6L6	0V.	3.15VAC**	350VDC	285VDC	0V.	0V.	3.15VAC**	19VDC
5	5U4G	0V.	400VDC	0V.	360VAC	0V.	360VAC	0V.	400VDC
6	5U4G	0V.	400VDC	0V.	360VAC	0V.	360VAC	0V.	400VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6L6	0Ω	.05Ω	26KΩ	27.5KΩ	13KΩ	10KΩ	.05Ω	80Ω
2	6L6	0Ω	.05Ω	26KΩ	27.5KΩ	13KΩ	110KΩ	.05Ω	80Ω
3	6L6	0Ω	.05Ω	26KΩ	27.5KΩ	13KΩ	10KΩ	.05Ω	80Ω
4	6L6	0Ω	.05Ω	26KΩ	27.5KΩ	13KΩ	110KΩ	.05Ω	80Ω
5	5U4G	INF.	26KΩ	INF.	17Ω	INF.	19Ω	INF.	26KΩ
6	5U4G	INF.	26KΩ	INF.	17Ω	INF.	19Ω	INF.	26KΩ

**6.3VAC READ BETWEEN PINS.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS

MAGNAVOX CHASSIS MODELS
AMP-108A, AMP-108B

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Power Output	6L6	6L6	7AC	
2	" "	6L6	6L6	7AC	
3	" "	6L6	6L6	7AC	
4	" "	6L6	6L6	7AC	
5	Rectifier	5U4G	5U4G	5T	
6	"	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	475	27002302					■ Filter
B	10	475						▲ "
8A	30	475	27002302					■ "
B	10	475						▲ "
9A	30	475	27002302					■ "
B	10	475						▲ Output Cathode Bypass
10	.02	600	250159G3	684-02	DT6S2	MPH-6-02	TC-12	Line Filter
11	.02	600	250159G3	684-02	DT6S2	MPH-6-02	TC-12	" "
12	.005	600	250152G41	684-005	DT6D5	ST-6-005	TC-25	RF Bypass Pwr. Supply
13	.01	600	250155G2	684-01	DT6S1	ST-6-01	TC-11	Tone Compensation
14	.01	600	250159G2	684-01	DT6S1	ST-6-01	TC-11	" "
15	.03	600	250152G25	684-03	DT6S3	ST-6-03	TC-13	" "
16	.02	600	250159G3	684-02	DT6S2	MPH-6-02	TC-12	Line Filter
17	15	500	250159G93	1468-00001	5W5Q2	MO.5-41	MS-415	Tone Comp.
18	15	500	250159G93	1468-00001	5W5Q2	MO.5-41	MS-415	" "
43	8	100				ALXC-2.2-8		Speaker Tone Comp.

RESISTORS

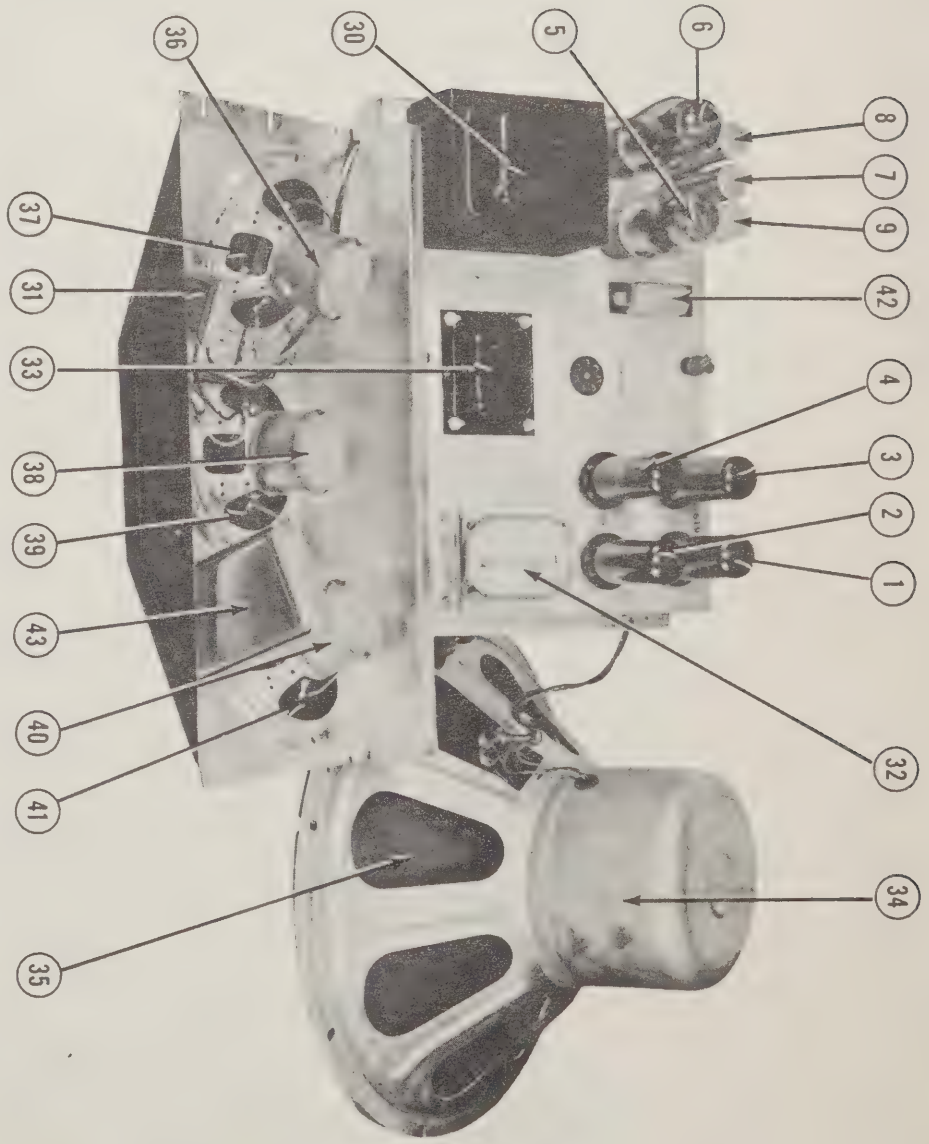
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
19	100KΩ	½	230084G86	BTS-100K	Br.-Blk.-Yl. Input Transformer Shunt
20	3900Ω	½	230084G69	BTS-3900	Or.-White-Red Tone Compensation
21	100KΩ	1	230085G25	BTA-100K	Br.-Blk.-Yl. " "
22	100KΩ	1	230085G25	BTA-100K	Br.-Blk.-Yl. " "
23	10KΩ	½	230084G19	BTS-10K	Br.-Blk.-Or. Output Grid
24	10KΩ	½	230084G19	BTS-10K	Br.-Blk.-Or. " "
25	220Ω	½	230084G9	BW-½-220	Red-Red-Br. Parasitic Suppressor
26	220Ω	½	230084G9	BW-½-220	Red-Red-Br. " "
27	1500Ω	10	240021G12	AB-1500	Filter
28	15KΩ	2	230086G20	BT-2-15K	Br.-Grn.-Or. Bleeder
29A	1000Ω	3	240038G1	AB-1000	Filter
B	8000Ω	3	240038G1	AB-8000	Voltage Dropping
C	80Ω	3	240038G1	ABA-100	Output Cathode-See Note

Note-On IRC replacement set slider at 80Ω from one end.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
30	117V AC @ 2.1A	720V CT @ .275A	5.0V AC @ 6.0A	6.3V CT @ 5.8A	300039G1			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TONE CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: MAGNAVOX PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
31		.3Ω	2 Milli-henries					

TRANSFORMER (DRIVER)

ITEM No.	RATING: IMP. RATIO PRI. to SEC.1	RATING: DC RES. PRI.	RATING: DC RES. SEC.1	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
32	1 to 2.7	230Ω	300Ω	320017G1		T-20A19#		#Drill new mounting holes.
	PRI. to SEC. 2 1 to 2.7		SEC2 300Ω					

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
33	3600Ω CT	13Ω tapped @ 7Ω & 1.5Ω	108Ω CT	.9Ω tapped @ .6Ω & .3Ω	330028G1		T-22S78		

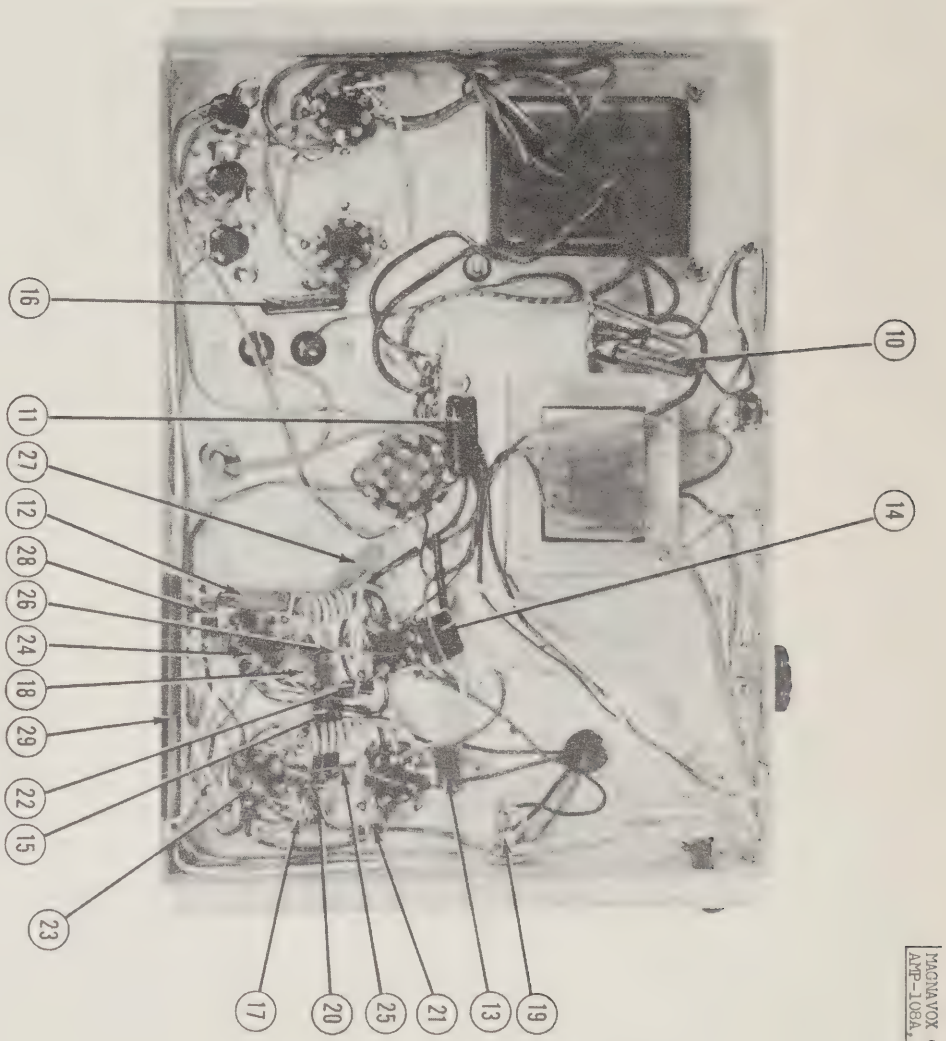
SPEAKER

ITEM No.	RATINGS: FIELD RES. / CONE DIA. / FIELD	RATINGS: VC IMP. / VC DIA.	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
34A	150Ω	13Ω	583002			
B			582999			Alternate PM speaker used in Model 108B with 36C.
35	CONE DIA. 14-5/8"	VC DIA. 1-1/2"				
36A	FIELD PM	VC IMP. 3.9Ω	583003			Used only in Model 108A
B			580005			Used in Model 108B to replace Items 36A, 38 and 40. Used with 583002.
C			580006			Used in Model 108B to replace Item 36A, 38 and 40. Used with 582999.
37	CONE DIA. 4-5/8"	VC DIA. 1/2"				
38	FIELD PM	VC IMP. 3.9Ω	583003			Used in Model 108A
39	CONE DIA. 4-5/8"	VC DIA. 1/2"				
40	FIELD PM	VC DIA. 3.9Ω	583003			Used in Model 108A
41	CONE DIA. 4-5/8"	VC DIA. 1/2"				

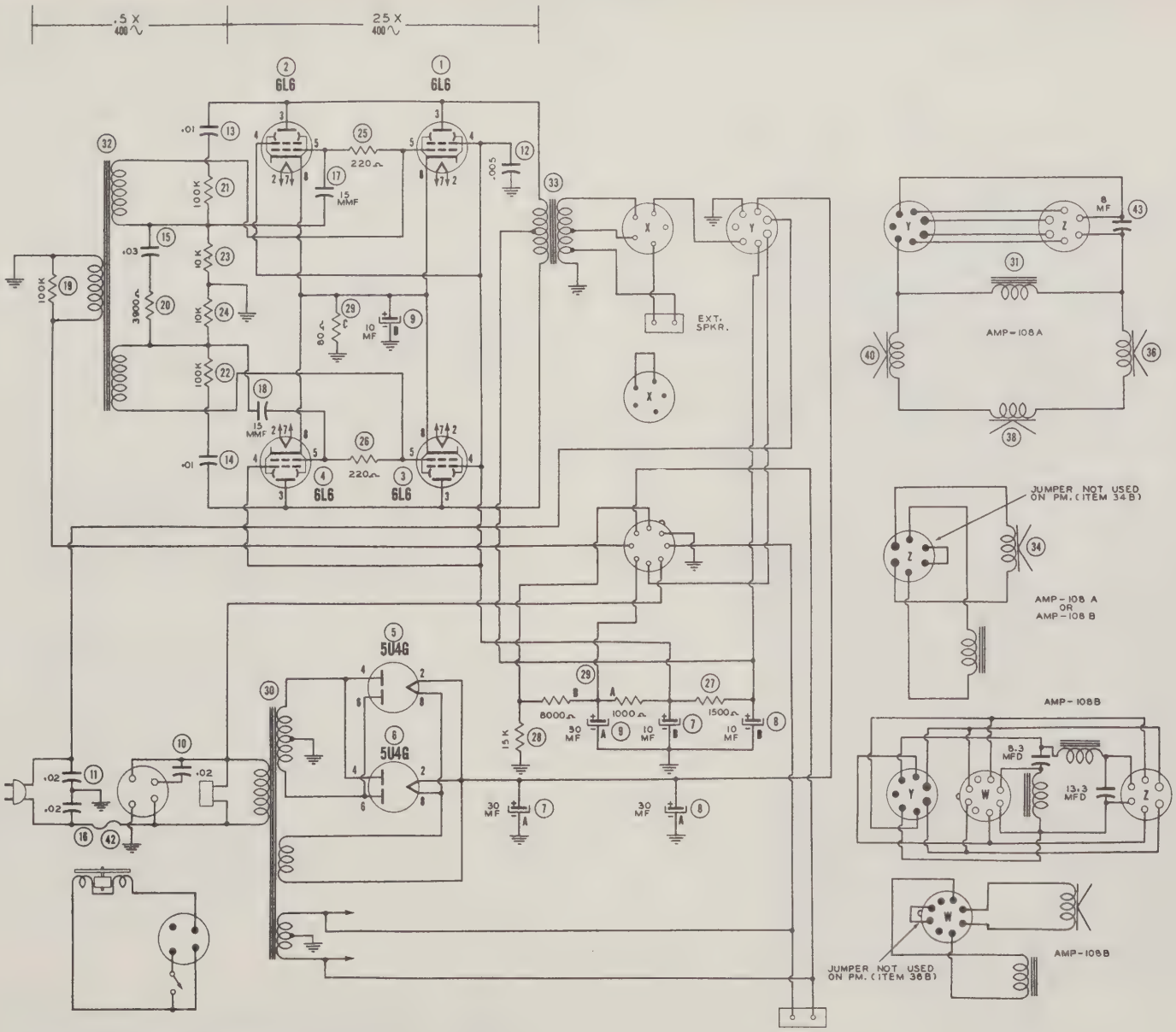
MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
42	Fuse		4 Amp. 250 Volt

CHASSIS—BOTTOM VIEW



MAGNAVOX CHASSIS MODELS AMP-108A, AMP-108B



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4811-10

TRADE NAME	Magnavox, Chassis Models CR-192A, CR-192B
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.
TYPE SET	AC Operated FM Tuner with Power Supply
TUBES (EIGHT)	Types, 6AG5 RF Amp., 6SB7Y Converter, 6SG7 1st IF Amp., 6SG7 2nd IF Amp., 6U5 Tuning Eye, 6SH7GT Limiter, 6H6 Detector, 6X5GT Rectifier.
POWER SUPPLY	110-120 Volts AC
RATING	.43 Amp. @ 117 Volts AC
TUNING RANGE-FREQ. MOD.	87.1-108-9MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01 MFD.	High side to Pin 8 (grid) of 6SB7Y. Low side to chassis.	10.7MC (unmodulated)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis.	A1,A2, A3,A4, A5,A6.	Adjust for maximum deflection.
2	.01 MFD.	"	10.775MC	"	DC probe to Point (B). Common to chassis	A7,A8.	Adjust for maximum deflection. Adjust output of signal gen. to give at least 3 volts deflection.
3	.01 MFD	"	10.7MC	"	"	A8	Adjust for zero deflection. Tune sig. gen. to 10.775MC and record VTVM reading. Tune signal generator to 10. 10.625MC and record. These two readings should be within 10% of each other. If not repeat Steps 2 & 3. Continue with RF Alignment in Step 4.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD	High side to Pin 4 (grid) of 6SG7 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Mod.)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A1,A2, A3,A4.	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
2	.01 MFD	High side to pin 8 (grid) of 6SB7Y. Low side to chassis.	"	"	"	A5,A6	"
3	.01 MFD	High side to pin 4 (grid) of 6SG7 1st IF Tube (4). Low side to chassis.	"	"	Vertical input to Point (C). Ground to chassis.	A7,A8	Alternately adjust A7 for maximum amplitude and A8 for maximum straightness of crossover lines with crossover lines occurring at center of pattern per Fig. 2. Continue with RF Alignment in Step 4.

RF ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	300Ω carbon res.	To dipole terminals.	108MC	108MC	DC probe to Point (A) Common to chassis	A9	Adjust for maximum deflection.
5	"	"	"	Tune for maximum deflection.	"	A10,A11	Rock tuning cap. & adjust for maximum deflection.

MAGNAVOX CHASSIS MODELS
CR-192A, CR-192B

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DATE 5/48-#4811-11 SET #41-FOLDER #11

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6AG5	6AG5	7BD	
2	Converter	6SB7Y	6SB7Y	8R	
3	1st IF Amp.	6SG7	6SG7	8BK	
4	2nd IF Amp.	6SG7	6SG7	8BK	
5	Tuning Eye	6U5	6U5	6R	
6	Limiter	6SH7GT	6SH7GT	8BK	
7	Detector	6H6	6H6	7Q	
8	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

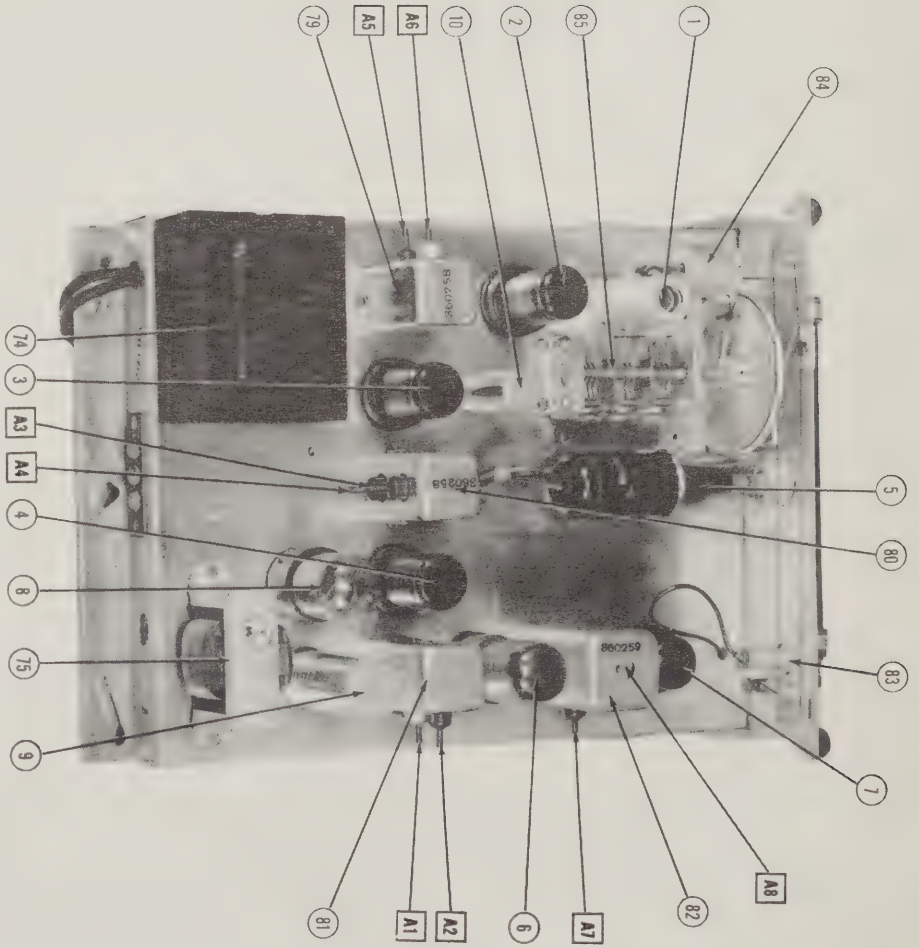
ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	10	475	27002302	AF64K4A	UP15D145	DY-3x15-450*	EL-344	▲ Filter
B	30	475						■ "
10	10	450	27002303	PRS450/10	BR1045	M-10-450	EL-1	"
11	.01	600	25012902	684-01	DT6S1	MPH-6-01	TC-11	Line Filter
12	.05	600	25012905	684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
13	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	Limiter Plate Decoup.
14	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	Limiter Screen Bypass
15	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Decoup.
16	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	2nd IF Cathode Bypass
17	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
18	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoupling
19	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
20	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	1st IF Cathode Bypass
21	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	AVC Filter
22	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	RF Bypass Pwr. Supp.
23	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	AVC Filter
24	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	Conv. Plate Decoup.
25	.01	600	25012902	684-01	DT6S1	ST-6-01	TC-11	Filament Bypass
26	470	500	250159G90	1468-0005	5W5T5	MO.5-35	1FM-35	De-emphasis
27	100	500	250159G98	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
28	100	500	250159G98	1468-0001	5W5T1	MO.5-31	1FM-31	" "
29	47	500	250159G96	1468-00005	5W5Q5	MO.5-45	1FM-45	Limiter Grid Filter
30	470	500	23008407	1468-0005	5W5T5	MO.5-35	1FM-35	IF Coupling
31	470	500	23008407	1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Feedback
32	35	500	250088G26	1468-00004	5W5Q4	MO.5-44	1FM-44	Osc. Grid Cap.-Cer.
33	10	500		1469-00001	5R5Q1	MOS.5-41	MS-41	Fixed Trimmer-Cer.
34	35	500	250088026	1468-00004	5W5Q4	MO.5-44	1FM-44	RF Coupling-Cer.
35	500	500	250088031	1468-0005	5W5T5	MO.5-35	1FM-35	RF Plate Decoupling-Cer.
36	500	500	250088031	1468-0005	5W5T5	MO.5-35	1FM-35	RF Screen Bypass-Cer.
37	500	500	250088031	1468-0005	5W5T5	MO.5-35	1FM-35	RF Cathode Bypass-Cer.
38	500	500	250088031	1468-0005	5W5T5	MO.5-35	1FM-35	" " " "
39	35	500	250088026	1468-00004	5W5Q4	MO.5-44	1FM-44	RF Coupling-Cer.
40	180	500	250159053					Fixed Pad

*Parallel sections to obtain desired capacity.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
41	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. RF Grid
42	22Ω	½	230084G9		Red-Red-Br. RF Cathode
43	1000Ω	½	230084G13	BTS-1000	Br.-Blk.-Red RF Plate Decoupling
44	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. Converter Grid-See Note 1
45	22KΩ	½	230084G21	BTS-22K	Red-Red-Or. Oscillator Grid
46	120KΩ	½	230084G87	BTS-120K	Br.-Red-Yl. 1st IF Transformer Shunt
47	1000Ω	½	230084G13	BTS-1000	Br.-Blk.-Red Converter Plate Decoupling
48	3300Ω	½	230084G16	BTS-3300	Or.-Or.-Red Converter Screen Dropping
49	470KΩ	½	230084G29	BTS-470K	Yl.-Vi.-Yl. AVC Network
50	120KΩ	½	230084G87	BTS-120K	Br.-Red-Yl. 1st IF Transformer Shunt

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MAGNAVOX PART No.	IRC PART No.	
51	1.0Ω	½	230084G7		Br.-Blk.-Br. 1st IF Cathode
52	1.0Ω	½	230084G13	BTS-1000	Br.-Blk.-Red 1st IF Screen Dropping
53	1000Ω	½	230084G13	BTS-1000	Br.-Blk.-Red 1st IF Plate Decoupling
54	1.5 Meg.	½	230084G32	BTS-1.5 Meg.	Br.-Grn.-Grn. AVC Network
55	120KΩ	½	230084G87	BTS-120K	Br.-Red-Yl. 2nd IF Transformer Shunt
56	120KΩ	½	230084G87	BTS-120K	Br.-Red-Yl. " " " "
57	100Ω	½	230084G7		Br.-Blk.-Br. 2nd IF Cathode
58	1000Ω	½	230084G13	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
59	120KΩ	½	230084G87	BTS-120K	Br.-Red-Yl. 3rd IF Transformer Shunt
60	120KΩ	½	230084G87	BTS-120K	Br.-Red-Yl. " " " "
61	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
62	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. Limiter Grid
63	39KΩ	½		BTS-39K	Or.-White-Or. Bleeder-See Note 2
64	27KΩ	½		BTS-27K	Red-Vi.-Or. Limiter Plate Decoupling-See Note 2
65	6800Ω	2	230061G18	BT-2-6800	Blue-Gray-Red Bleeder
66	4700Ω	1	230085G17	BTA-4700	Yl.-Vi.-Red Voltage Dropping
67	5000Ω	5	24003SG4	AB-5000	Filter
68	220KΩ	½		BTS-220K	Red-Red-Yl. Discriminator Transformer Shunt
69	47KΩ	½	230084G23	BTS-47K	Yl.-Vi.-Or. RF Filter
70	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
71	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. " " "
72	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. De-emphasis
73	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. Antenna Loading-See Note 2

Note 1-Some models use 47KΩ in this application. Replacement same as Item #69.
Note 2-Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAGNAVOX PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
74	117V AC @ .43A	520V CT @ .062A	6.4V AC @ 3.1A		300030G1	P-6120†	T22R04	P-2552†

†Add series resistor to reduce plate voltage.

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	MAGNAVOX PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
75	62MA.	530Ω	12.5 Henries	35003201	C1708#	T20C53	C-2990#	#Drill new mounting holes.

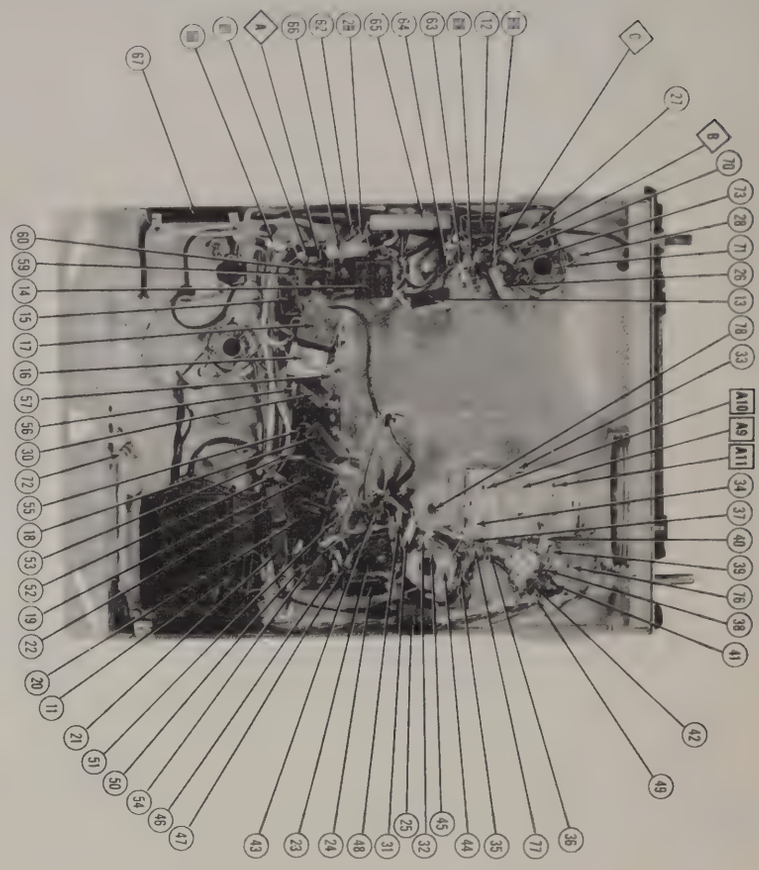
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.
76	Ant.Coil FM	0Ω	0Ω	360270G1	
77	RF Coil FM		0Ω	360271G1	
78	Osc.Coil FM	0Ω	.2Ω	360263G1	
79	1st IF Coil	.3Ω	.3Ω	360258G1	
80	2nd IF Coil	.3Ω	.3Ω	360258G1	
81	3rd IF Coil	.3Ω	.3Ω	360258G1	
82	Disc. Coil	.3Ω	.3Ω	360259G1	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MAGNAVOX PART No.		
83	Bayonet	7.5	0.2	White			Type 51

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
84	Switch	160163G1	On-Off
85	3 Gang Var. Cap.	260059G1	
A9	Trimmer	260067G1	FM Osc. Adj.
	Dial Scale	150287G1	Glass (CR-192A)
	" "	150287G2	" (CR-192B)

DISASSEMBLY INSTRUCTIONS

As the control panel is permanently fastened to the tuner in all models except those mounted in the Regency Symphony combination, it is not necessary to remove the control knobs from the cabinet. The instructions immediately following are for all combinations except the Regency Symphony. Separate instructions for removing the CR-192A chassis from that instrument are shown in this section.

Before removing the chassis, disconnect the antenna and ground leads from their terminals, and the output and the power cables from their receptacles. While holding the rear of the chassis in place with one hand, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Then while lowering the chassis, pull back on it to disengage the hooks from the slots in the tray to which the chassis is mounted, and withdraw the chassis from the cabinet.

In replacing the chassis, slide it in so that the small hooks near the front ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go so that the hooks engage the slots in the chassis tray; then lift up the rear of the chassis until the guide pin in the chassis tray projects through the triangular opening in the flange on the rear of the F-M chassis. Now pull back on the chassis. A ledge on the guide pin referred to above, will hold the chassis in place while the mounting screws are started into the captivated nuts on the top of the chassis tray. These nuts are accessible through the angular slots in the chassis flange and the Phillips-head screws should be turned in to within a few turns of being tight. Now slide the chassis forward until its panel is flush with the panel of the A-M radio chassis and tighten the two Phillips-head screws securely, completing the replacement operation.

REGENCY SYMPHONY.

To remove the CR-192A chassis from the Regency Symphony first remove the antenna and ground leads from their terminals and the output and power cables from their receptacles. Then pull the control knobs from their shafts and remove the two fancy-head screws from the front panel. Next, remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis and pull the chassis out of the rear of the cabinet.

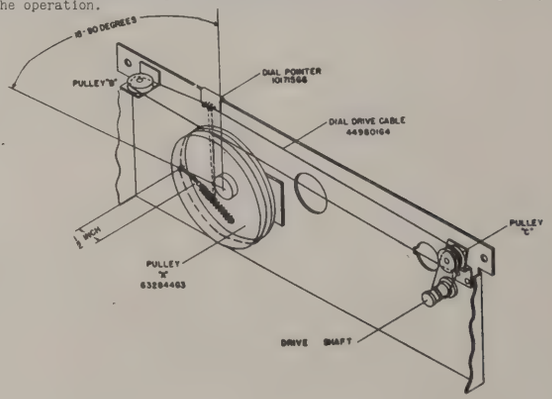
In replacing the chassis, the reverse order of the above instructions should be followed.

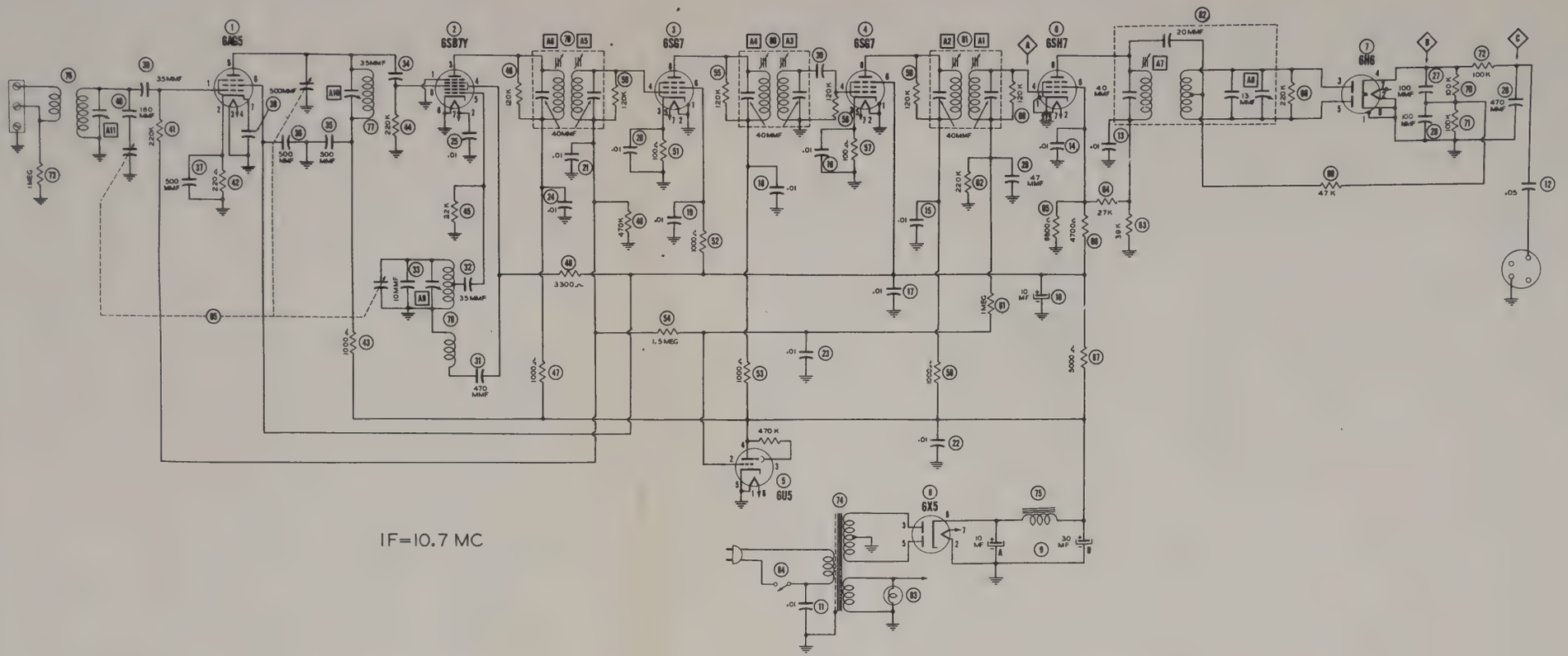
DIAL CORD REPLACEMENT

A single cable transmits motion from the dial tuning knob to rotate the condenser gang and to move the dial pointer. A 30-inch length of string is required to restring this assembly. After the broken cable is removed, turn Pulley "A" (see drawing) until the condenser gang plates are completely meshed. In this condition, the small hole in the rim of pulley "A" should be within the limits of 15 to 90 degrees to the left of being vertical as shown on drawing. If this hole is at a different position from the condition specified, loosen the two screws in the coupling to the condenser gang and turn pulley "A" while holding the condenser plates meshed. Tighten the two set screws after the adjustment has been made.

Lace one end of the new length of cable through the hole in pulley "A" and temporarily fasten it to the hook to which the spring is normally fastened. Make a complete turn around pulley "A" in a counter-clockwise direction, lace it around pulley "B", then across the rear of the dial scale and over the top of the front groove in pulley "C". Proceed down around the tuning shaft for 2½ turns in a clockwise direction and wrapping the cable over pulley "D" from front to back. Continue up over the rear groove of pulley "C" in a clockwise direction for one turn and extend the cable to the left so that the loose end is to the rear of the section of cable that it crosses. The loose end of the cable should now be wound over the top of pulley "A" so that it is nearest the dial frame and into the hole in the pulley groove. Remove the other end of the cable from the hook and while holding both ends taut, insert one end of the spring on the hook in pulley "A". Lace the two free ends of the cable through the opposite end of the spring and pull the cable until the spring is stretched to within 1/2" of the rim on the pulley. Tie a double knot so that the knot is around one coil of the spring, while maintaining tension on the cable.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. Press the crimping lugs on the dial pointer together over the cable. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to the cable where it is crimped by the pointer This completes the operation.





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AG5	0V.	1VDC	0V.	6.4VAC	240VDC	115VDC	1VDC	-
2	6SB7Y	0V.	6.4VAC	250VDC	60VDC	-7VDC§	0V.	0V.	-.7VDC
3	6SG7	.1VDC	0V.	.1VDC	0V.	.1VDC	110VDC	6.4VAC	240VDC
4	6SG7	.1VDC	0V.	.1VDC	0V.	.1VDC	110VDC	6.4VAC	240VDC
5	6U5	0V.	.1VDC	-.2VDC	250VDC	0V.	6.4VAC	-	-
6	6SH7GT	0V.	0V.	0V.	0V.	0V.	50VDC	6.4VAC	.4VDC
7	6H6	0V.	0V.	0V.	0V.	0V.	0V.	6.4VAC	0V.
8	6X5GT	0V.	6.4VAC	260VAC	0V.	260VAC	0V.	0V.	260VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6AG5	700KΩ	220Ω	0Ω	.1Ω	15KΩ	10KΩ	220Ω	-
2	6SB7Y	0Ω	.1Ω	15KΩ	13KΩ	22KΩ	0Ω	0Ω	220KΩ
3	6SG7	100Ω	0Ω	100Ω	470KΩ	100Ω	11KΩ	.1Ω	15KΩ
4	6SG7	100Ω	0Ω	100Ω	120KΩ	100Ω	10KΩ	.1Ω	15KΩ
5	6U5	0Ω	480KΩ	800KΩ	14KΩ	0Ω	.1Ω	-	-
6	6SH7GT	0Ω	0Ω	0Ω	220KΩ	0Ω	6KΩ	.1Ω	18KΩ
7	6H6	0Ω	0Ω	140KΩ	200KΩ	140KΩ	100KΩ	.1Ω	0Ω
8	6X5GT	INF.	.1Ω	14Ω	INF.	135Ω	INF.	0Ω	14KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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TRADE NAME	Magnavox, Chassis Models CR-207A, B, C, D
MANUFACTURER	Magnavox Co., 2131 Bueter Rd., Fort Wayne, Indiana
TYPE SET	Two Band AM Tuner
TUBES (SEVEN)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6J5 Det.-AVC, 6J5 1st AF Amp., 6J5 2nd AF Amp., 6U5 Tuning Eye.
POWER SUPPLY	Power Plug from Power Amplifier such as AMP-108 (Set 41-Folder 10)
TUNING RANGE—BROADCAST	530-1610KC SHORT WAVE 4.9-18.1MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed. Pointer should set at last reference mark at low frequency end of dial. If it does not, loosen set screw on tuning cap. drum and set pointer correctly.

Treble control should be at sharp tune, volume control at maximum, and output of sig. gen. no higher than is necessary to obtain an output reading. Use an insulated alignment screwdriver for all adjustments.

In Step 7, if an audio oscillator is not available. turn band switch to BC and tune receiver to a point between two stations on adjacent channels having approximately same power. If A12 is out of adjustment a 10KC whistle will be heard. Adjust A12 until whistle is at minimum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	250MMFD	High side to Pin 8 (grid) of 6SA7 Low side to chassis.	455KC	BC (1 position clockwise)	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2	250MMFD	High side to ant. terminal. Low side to chassis. Antenna loop switch (82) in "Ant." position.	600KC	"	600KC	"	A5	Rock tuning cap. and adjust for maximum output.
3	250MMFD	"	1400KC	"	1400KC	"	A6	Adjust for maximum output
4	250MMFD	"	"	"	Tune for maximum output.	"	A7,A8	Adjust for maximum output Repeat Steps 2, 3 & 4 until no further improvement can be made.
5	400Ω carbon res.	"	15MC	SW (fully counter-clockwise)	15MC	"	A9	Adjust for maximum output. Tune sig. gen. to 14.1MC. If signal is not heard retune sig. gen. to 15MC. Close A9 to next peak, adjust for maximum output and recheck for image.
6	"	"	"	"	Tune for maximum output.	"	A10,A11	Rock tuning cap. and adjust for maximum output.
7		High side to phono jack. Low side to chassis.	10,000∿ (Audio Gen.)			"	A12	Turn treble control to full range. Adjust A12 for minimum output. If an audio gen. is not available see prealignment instructions for adjustment of A12. Install chassis in cabinet.
8		Ant. loop switch (82) in "Loop" position. Use radiation loop.	1400KC	BC	Tune for maximum output.	"	A13	Turn treble control to sharp tune. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

MAGNAVOX CHASSIS MODELS
CR-207A, B, C, D

MAGNAVOX CHASSIS MODELS
CR-207A, B, C, D

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MAGNAVOX PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC'	6J5	6J5	6Q	
5	1st AF	6J5	6J5	6Q	
6	2nd AF	6J5	6J5	6Q	
7	Tuning Eye	6U5	6U5	6R	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

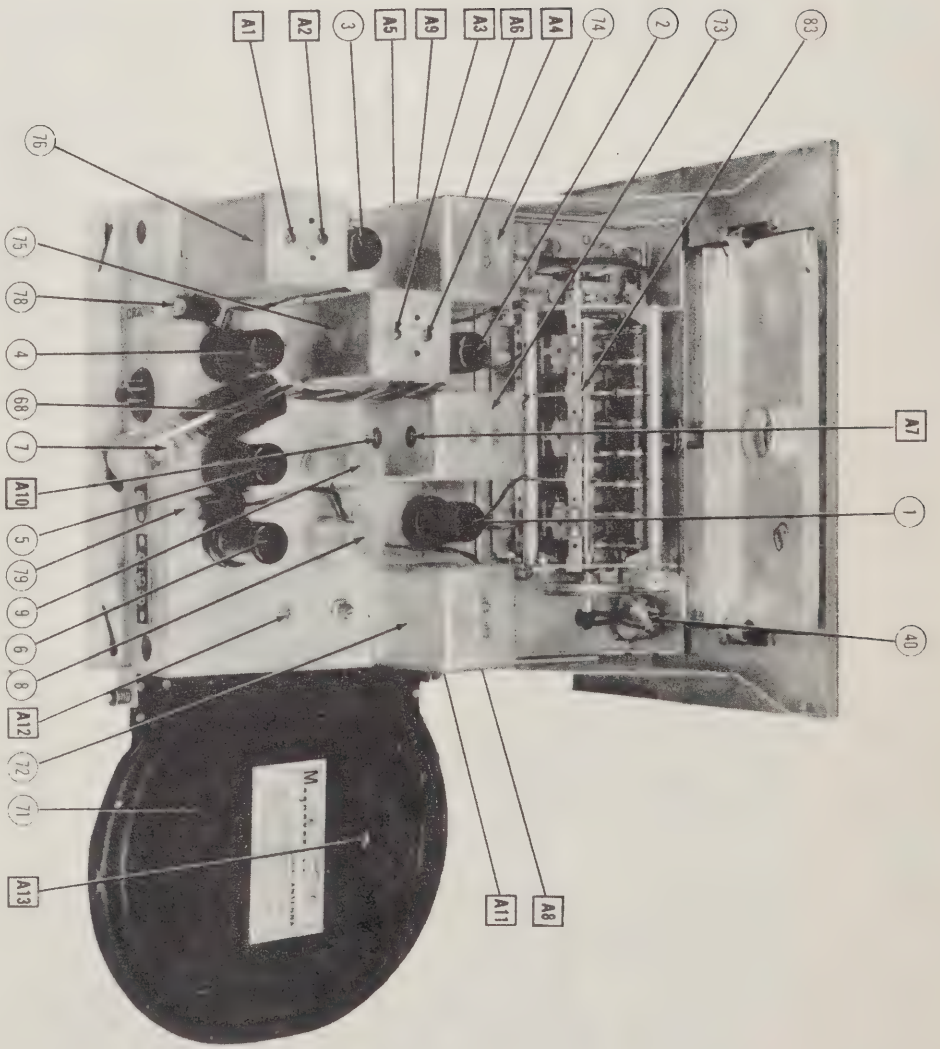
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
8A	10	450	27002306	AF22J4A*	UP2145	DY-10-450/25-50	EL-363*	■ 2nd AF Plate Decoup.
B	20	25						▲ 2nd AF Cathode Bypass
9A	10	450	27002306	AF22J4A*	UP2145	DY-10-450/25-50	EL-363*	■ 1st AF Plate Decoup.
B	20	25						▲ 1st AF Cathode Bypass
10	.05	120	250129G5	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
11	.012	200	250129G13					Tone Comp.
12	.004	600	250129G7	684-004	DT6D4	ST-6-004	TC-24	" "
13	.004	600	250129G7	684-004	DT6D4	ST-6-004	TC-24	" "
14	.1	400	250129G22	484-.1	DT4P1	ST-4-.1	TC-1	Audio Coupling
15	.01	400	250129G9	484-01	DT4S1	ST-4-01	TC-11	Tone Comp.
16	.005	400	250129G10	484-005	DT6D5	ST-6-005	TC-25	Tone Comp.
17	.02	600	250129G3	484-02	DT6S2	ST-4-02	TC-12	Audio Coupling
18	.01	400	250129G9	484-01	DT4S1	ST-4-01	TC-11	" "
19	.05	200	250129G5	484-05	DT4S5	ST-4-05	TC-15	IF Cathode Bypass
20	.05	120	250129G5	484-05	DT4S5	ST-4-05	TC-15	Conv. Cathode Bypass
21	.05	120	250129G5	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
22	.25	400	250152G21	484-.25	DT4P25	ST-4-.25	TC-2	RF Bypass Pwr. Supply
23	.25	400	250152G21	484-.25	DT4P25	ST-4-.25	TC-2	RF Screen Bypass
24	.05	200	250129G5	484-05	DT4S5	ST-4-05	TC-15	RF Cathode Bypass
25	.05	120	250129G5	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
26	.01	600	250129G9	684-01	DT6S1	ST-6-01	TC-11	Ant. Coupling
27	1000	500	250159G133	1468-001	1W5D1	MW.5-21	1FM-21	Tone Comp.
28	1000	500	250159G133	1468-001	1W5D1	MW.5-21	1FM-21	" "
29	510	500	250159G64	1468-0005	5W5T5	MO.5-35	1FM-35	" "
30	220	500	250159G100	1468-00025	5W5T25	MO.5-325	1FM-325	" "
31	220	500	250159G100	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
32	330	500	250159G88	1468-0003	5W5T3	MO.5-33	1FM-33	Tone Comp.
33	510	500	250159G64	1468-0005	5W5T5	MO.5-35	1FM-35	Phono Coupling
34	510	500	250159G64	1468-0005	5W5T5	MO.5-35	1FM-35	Phono Tone Comp.
35	490	500	250085G32	1469-0005	5R5T5	MOS.5-35	MS-35	Fixed Pad
36	50	500	250088G25	1468-00005	5W5Q3	MO.5-45	1FM-45	Osc. Grid Cap.
37	4700	500	250161G24	1467-005	1D5D5	MW.5-25	1FM-25	RF Coupling
38	4700	500	250161G24	1467-005	1D5D5	MW.5-25	1FM-25	" "
39	470	500	250159G90	1468-0005	5W5T5	MO.5-35	1FM-45	Tone Compensation

*Omit one section.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	IRC PART No.	CLAROSTAT PART No.	
40A	1 Meg.	½	220044G15	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 52A per instructions
41A	1 Meg.	½	220045G2	D13-137	M-63-Z	Bass Control
B	Shaft		Not Req.	A	Not Req.	Attach to 53A per instructions
C	Switch		" "	41	SW-A	" " " " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MAGNAVOX PART No.	IRC PART No.	
42	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. RF Grid
43	150Ω	½	230084G8		Br.-Grn.-Br. RF Cathode
44	4700Ω	½	230084G17	BTS-4700	Yl.-Vi.-Red RF Cathode
45	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. AVC Network
46	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. " "
47	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
48	22KΩ	½	230084G21	BTS-22K	Red-Red-Or. Tone Compensation
49	33KΩ	½	230084G22	BTS-33K	Or.-Or.-Or. Oscillator Grid
50	150Ω	½	230084G8		Br.-Grn.-Br. Converter Cathode
51	100Ω	½	230084G87		Br.-Blk.-Br. Parasitic Suppressor
52	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. 1st AF Grid
53	47KΩ	½	230084G23	BTS-47K	Yl.-Vi.-Or. Phono Tone Compensation-See Note
54	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
55	1.5 Meg.	½	230084G32	BTS-1.5 Meg.	Br.-Grn.-Grn. " "
56	820Ω	½	230084G61	BTS-820	Gray-Red-Br. IF Cathode
57	22KΩ	½	230084G21	BTS-22K	Red-Red-Or. Diode RF Filter
58	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. Diode Load
59	2200Ω	½	230084G15	BTS-2200	Red-Red-Red 1st AF Cathode
60	100KΩ	1	230085G25	BTA-100K	Br.-Blk.-Yl. 1st AF Plate Load
61	220KΩ	½	230084G27	BTS-220K	Red-Red-Yl. 1st AF Plate Decoupling
62	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. Tone Compensation
63	47KΩ	½	230084G23	BTS-47K	Yl.-Vi.-Or. " "
64	470Ω	½	230084G11	BTS-470	Yl.-Vi.-Br. 2nd AF Cathode
65	15KΩ	1	230085G20	BTA-15K	Br.-Grn.-Or. 2nd AF Plate Load
66	10KΩ	1	230085G19	BTA-10K	Br.-Blk.-Or. 2nd AF Plate Decoupling
67	100KΩ	½	230084G25	BTS-100K	Br.-Blk.-Yl. Voltage Dropping
68	560KΩ	½	230084G95	BTS-560K	Grn.-Blue-Yl. Tuning Indicator Plate Load
69	1 Meg.	½	230084G31	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
70	10KΩ	½	230084G19	BTS-10K	Br.-Blk.-Or. RF Coil Shunt

Note-Not used in Models B & D.

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.	
71	Loop Ant.		1.3Ω			
72A	BC Ant.Coil	15.5Ω‡	3.5Ω	36025G3		‡Includes both primaries A & B.
B	SW " "		.1Ω			
73A	BC RF Coil	18.5Ω‡	2.5Ω	36025G4		
B	SW " "		.2Ω			
74A	BC Osc.Coil	.3Ω	3.7Ω	36025G2		
B	SW " "	0Ω	.3Ω			
75	Input IF	6.7Ω	6.5Ω	36002G1		
			.5Ω†			†Tertiary Winding
76	Output IF	7.5Ω	7.5Ω	36002G1		
77	10KC Filter		225Ω	36024G1		

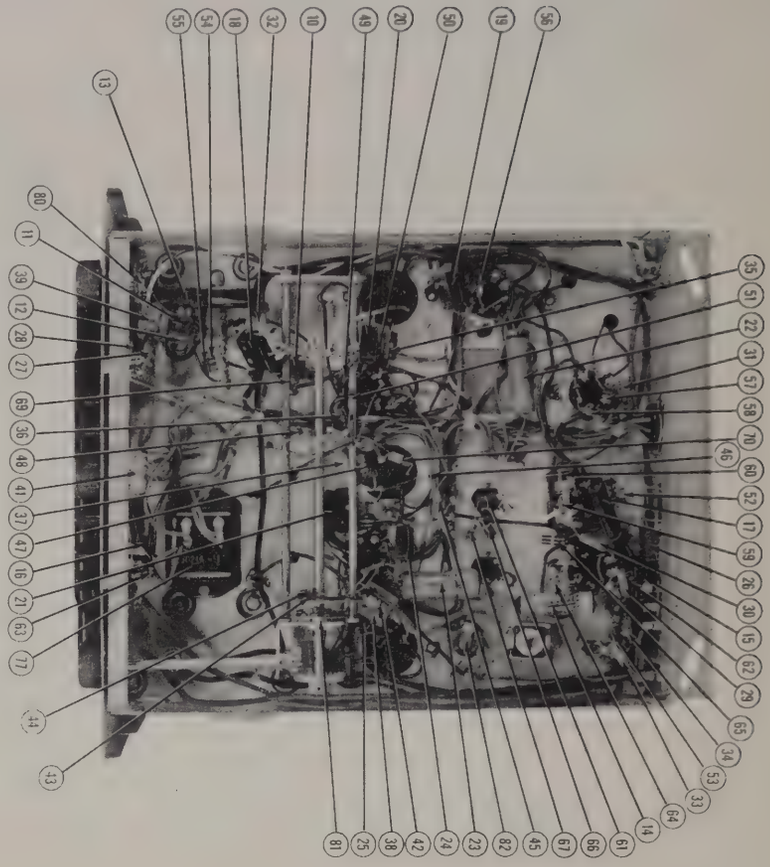
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MAGNAVOX PART No.		
78	Bayonet	6-8	0.25	Blue			Type 44
79	"	6-8	0.25	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
80	Switch	160161G1	Treble Tone
81	"	160160G1	Band
82	"	160115?G1	Ant. Loop
83	3 Gang Var. Cap.	26005G2	(16-558MMF) each section
A12	Trimmer	36024G1	10KC Adj.
	Dial Scale	15028?G1	Glass

CHASSIS—BOTTOM VIEW



DISASSEMBLY INSTRUCTIONS

Model CR-207 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet- it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wire to the corresponding terminals (L and H) on the chassis.

DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 1 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical-See Figure 1. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D". If this hole is not approximately 45 degrees back from vertical as shown on Figure 1, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 1. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B", around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C", and over the top of pulley "D". Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow 1/4" to 5/16" of cable between the spring and the inside rim of pulley "D". Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

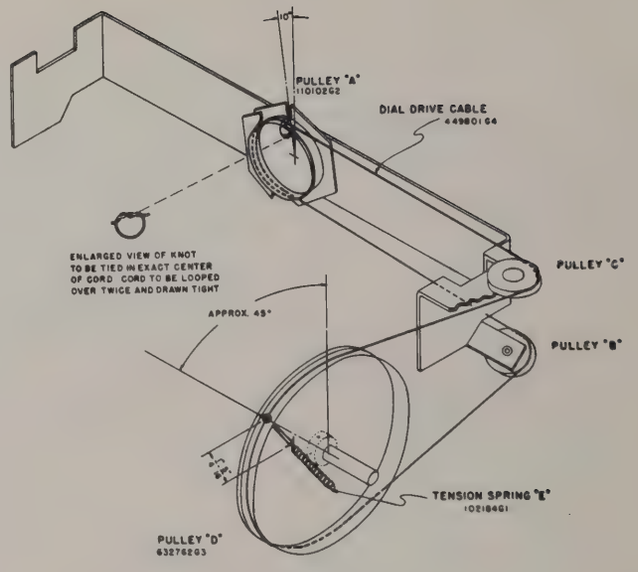
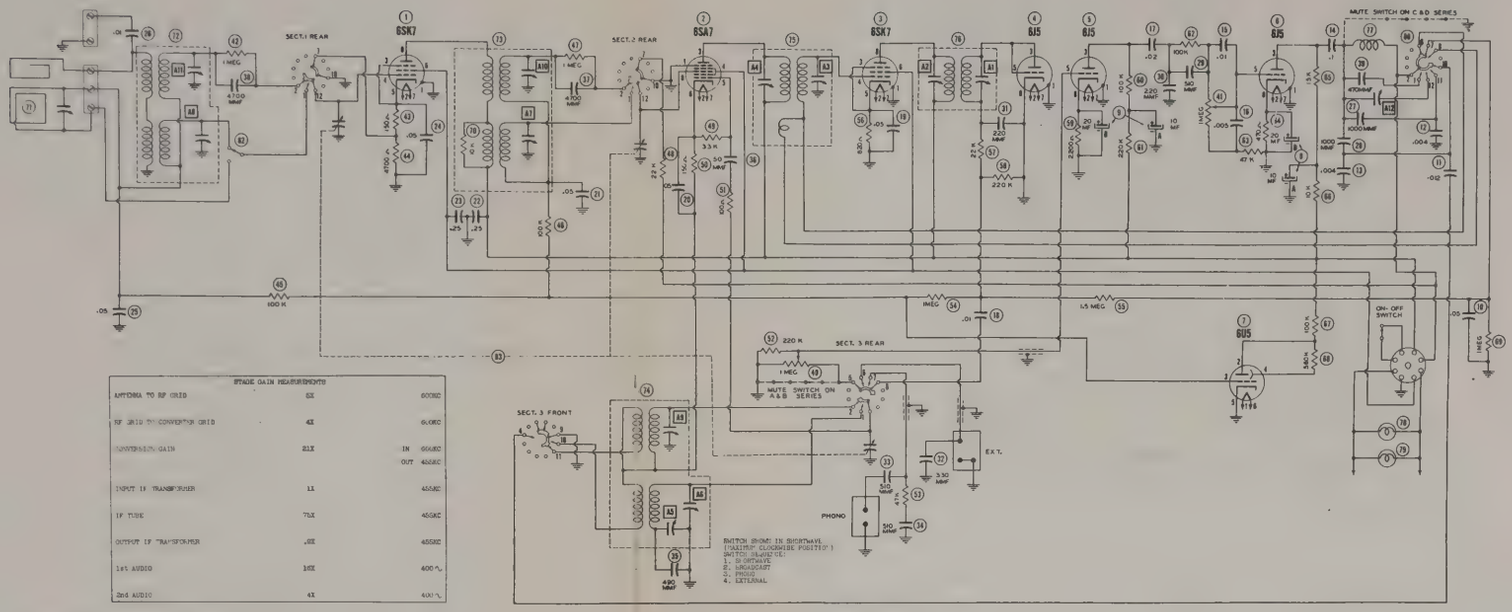

PULLEY "A"
DIAL DRIVE CABLE
ENLARGED VIEW OF KNOT TO BE TIED IN EXACT CENTER OF CORD CORD TO BE LOOPED OVER TWICE AND DRAWN TIGHT
PULLEY "C"
APPROX. 45°
PULLEY "B"
TENSION SPRING "E"
PULLEY "D"

FIGURE 1

SEE CHASSIS CR-188 SET #18 FOLDER #22 FOR CONDENSER GANG DRIVE ADJUSTMENTS ON CHASSIS CR-207A,CR-207C.
SEE CHASSIS CR-198 SET #17 FOLDER #20 FOR CONDENSER GANG DRIVE ADJUSTMENTS ON CHASSIS CR-207B,CR-207D.

DATE 5/48-#4811-11 SET #41-FOLDER # 12



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4811-12

VOLTAGE AND RESISTANCE READINGS
TAKEN USING AMP-108 AS POWER SOURCE.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	3.15VAC**	11VDC	-.3VDC	11VDC	110VDC	3.15VAC**	260VDC
2	6SA7	0V.	3.15VAC**	260VDC	110VDC	-6.5VDC$	1.6VDC	3.15VAC**	-.3VDC
3	6SK7	0V.	3.15VAC**	5.5VDC	0V.	5.5VDC	110VDC	3.15VAC**	260VDC
4	6J5	0V.	3.15VAC**	-.4VDC	-.4VDC	-.4VDC	-.35VDC	3.15VAC**	0V.
5	6J5	0V.	3.15VAC**	35VDC	0V.	0V.	0V.	3.15VAC**	1.3VDC
6	6J5	0V.	3.15VAC**	115VDC	0V.	0V.	115VDC	3.15VAC**	2.4VDC
7	6U5	3.15VAC**	21VDC	-.4VDC	145VDC	0V.	3.15VAC**	-	-

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	.05Ω	4.8KΩ	2.5 Meg.	4.8KΩ	15KΩ	.05Ω	26KΩ
2	6SA7	0Ω	.05Ω	26KΩ	15KΩ	33KΩ	150Ω	.05Ω	2.5 Meg.
3	6SK7	0Ω	.05Ω	820Ω	750KΩ	820Ω	15KΩ	.05Ω	26KΩ
4	6J5	0Ω	.05Ω	240KΩ	240KΩ	240KΩ	220KΩ	.05Ω	0Ω
5	6J5	0Ω	.05Ω	340KΩ	INF.	180KΩ	INF.	.05Ω	2.2KΩ
6	6J5	0Ω	.05Ω	50KΩ	1.3 Meg.	1 Meg.	50KΩ	.05Ω	470Ω
7	6U5	.05Ω	680KΩ	1.3 Meg.	120KΩ	0Ω	.05Ω	-	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

**6.3V AC READING TAKEN BETWEEN PINS.

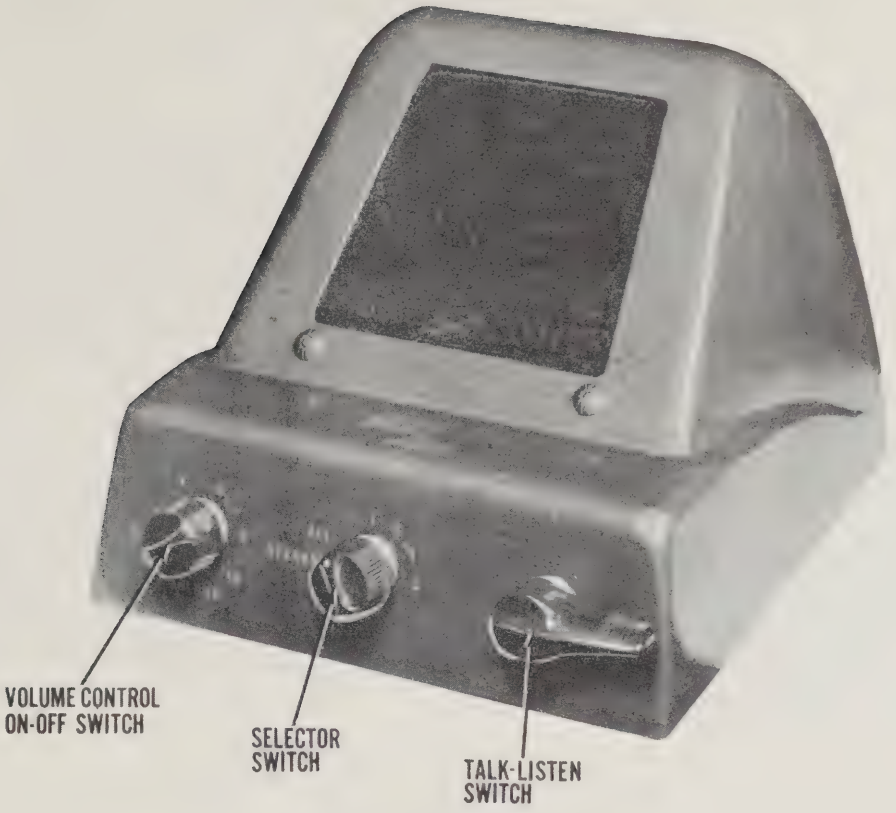
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

BASS CONTROL AT MAXIMUM CLOCKWISE.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MASCO MODEL
IM-5



MASCO MODEL
IM-5

MASCO MODEL IM-5

TRADE NAME	Masco, Model IM-5
MANUFACTURER	Mark Simpson Mfg. Co., Inc. 32-28 49th St., Long Island City, N.Y.
TYPE SET	AC-DC Operated Intercommunication System
TUBES (THREE)	Types, 14F7 AF Amp., 50L6GT Power Output, 50Y6GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC RATING .25 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14F7	13VAC	.7VDC	40VDC	0V.	0V.	52VDC	.9VDC	0V.
2	50L6GT	0V.	60VAC	125VDC	125VDC	0V.	0V.	13VAC	8VDC
3	50Y6GT	0V.	110VAC	117VAC	140VDC	117VAC	130VDC	60VAC	140VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14F7	13Ω	2.2KΩ	280KΩ	815Ω	470KΩ	280KΩ	5KΩ	0Ω
2	50L6GT	INF.	65Ω	75KΩ	77KΩ	0Ω	0Ω	13Ω	150Ω
3	50Y6GT	INF.	115Ω	150Ω	75KΩ	150Ω	75KΩ	65Ω	75KΩ

V&R taken in stand by position.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at minimum, no signal applied for voltage measurements.

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PARTS LIST AND DESCRIPTIONS

MASCO
MODEL IM-8

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MASCO PART No.	STANDARD REPLACEMENT		
1	AF Amp.	14F7	14F7	8AC	
2	Power Output	50L6GT	50L6GT	7AC	
3	Rectifier	50Y6GT	50Y6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
4A	40	150		PRSA150-40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Red
B	40	150						" -Red- White
5	8	450		PRS450-8	BR845	M-8-450	UT-8	"
6	8	450		PRS450-8	BR845	M-8-450	UT-8	"
7	10	50		PRS50-10	BR105	M-10-50	TA-510	Output Cathode Bypass
8	.005	600		684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
9	.1	600		684-.1	DT6P1	ST-6-.1	TC-1	Line Isolation
10	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Audio Coupling

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	
11A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 11A per instructions
C	Switch			41	SW-A	" " " " "

RESISTORS

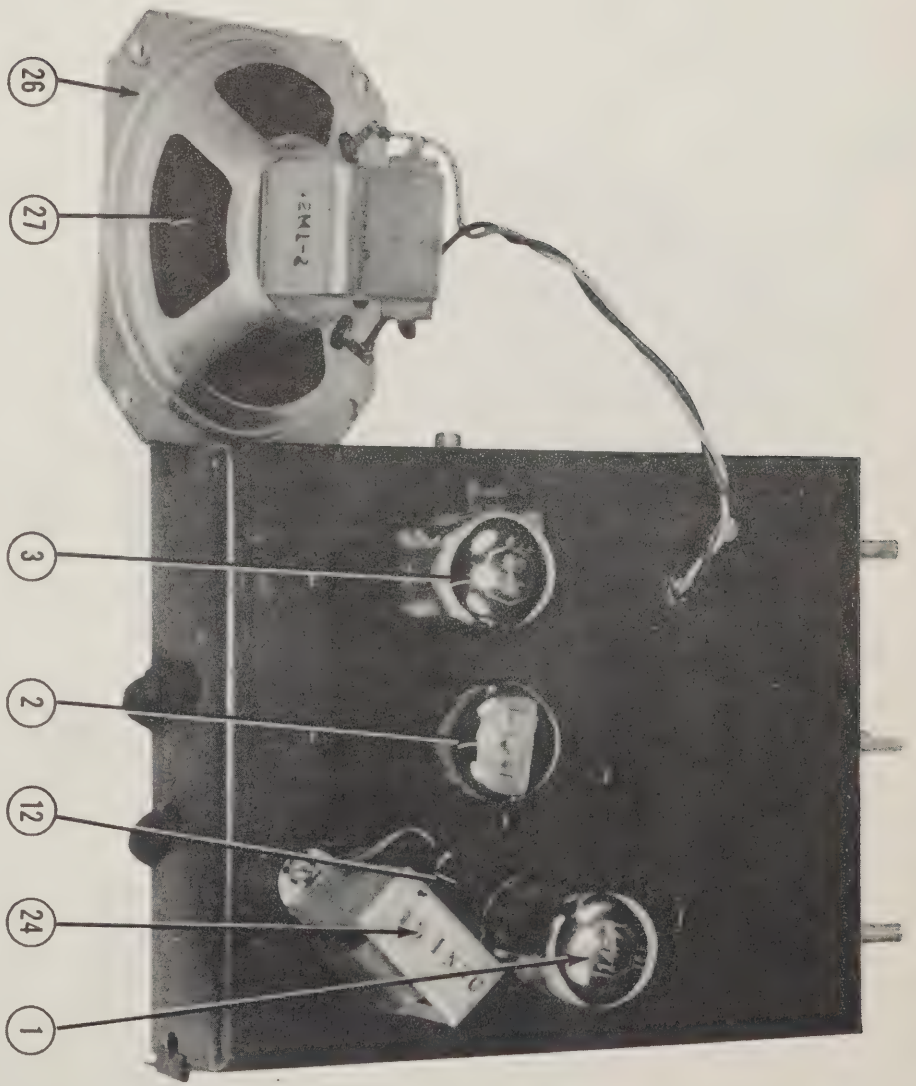
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
12	18Ω	½		BW-½-18	Br.-Gray-Blk. Input Shunt
13	2200Ω	½		BTS-2200	Red-Red-Red 1st AF Cathode
14	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
15	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd AF Grid
16	5000Ω	½		BTS-4700	Grn.-Blk.-Red 2nd AF Cathode
17	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 2nd AF Plate Load
18	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Decoupling
19	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
20	2200Ω	½		BTS-2200	Red-Red-Red Filter
21	150Ω	½		BW-½-150	Br.-Grn.-Br. "
22	40Ω	5		ABA-50	Line Dropping-See Note
23	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Feedback

Note-On IRC replacement set slider at 40Ω from one end.

TRANSFORMER (INPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
24	12Ω	22KΩ	10.5Ω	815Ω	13IN2C			A-2998*	*Connect in reverse using 7000Ω tap.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
25	1600Ω	12Ω	145Ω	1.2Ω	13-0-2C				

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MASCO PART No.	JENSEN PART No.	QUAM PART No.	
26	FIELD PM	VC IMP. 12Ω	42M1-2			
27	CONE DIA. 4"	VC DIA. 1/2"				

MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
28	Switch		Station Selector
29	"		Talk-Listen

INSTALLATION

1. Determine location of each station.

2. Determine footage of cable required, remembering:
   A. Allowance must be made for bends, curves around doors etc.
   B. Number of wires in cable must be equal to number of stations in system PLUS one.

3. Assign an identifying number (1, 2, 3 etc.) to each wire in the interconnecting cable.

4. Assign an identifying letter (A, B, C etc.) to each station.

5. Wire the cable emerging from the back of each station to the interconnecting cable according to the chart below:

Interconnecting Cable Wire Numbers (as assigned in Step #3).

Station	1	2	3	4	5	6	7
A	Grey*	Black	Red	Yellow	Green	Blue	Brown
B	Grey*	Brown	Black	Yellow	Green	Blue	Red
C	Grey*	Brown	Red	Black	Green	Blue	Yellow
D	Grey*	Brown	Red	Yellow	Black	Blue	Green
E	Grey*	Brown	Red	Yellow	Green	Black	Blue
F	Grey*	Brown	Red	Yellow	Green	Blue	Black

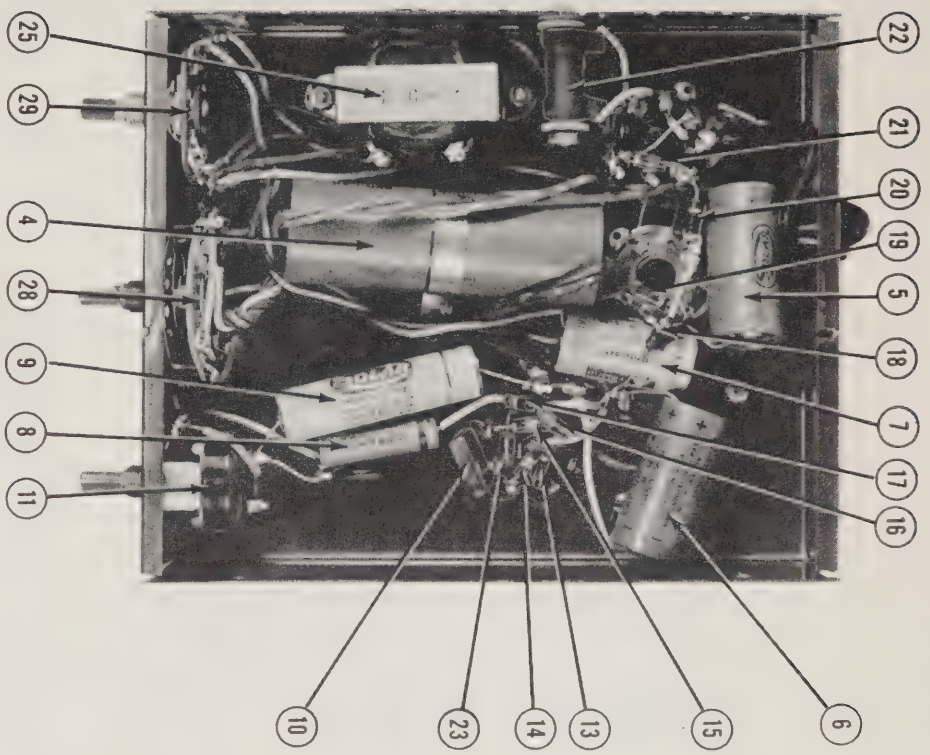
* or Violet

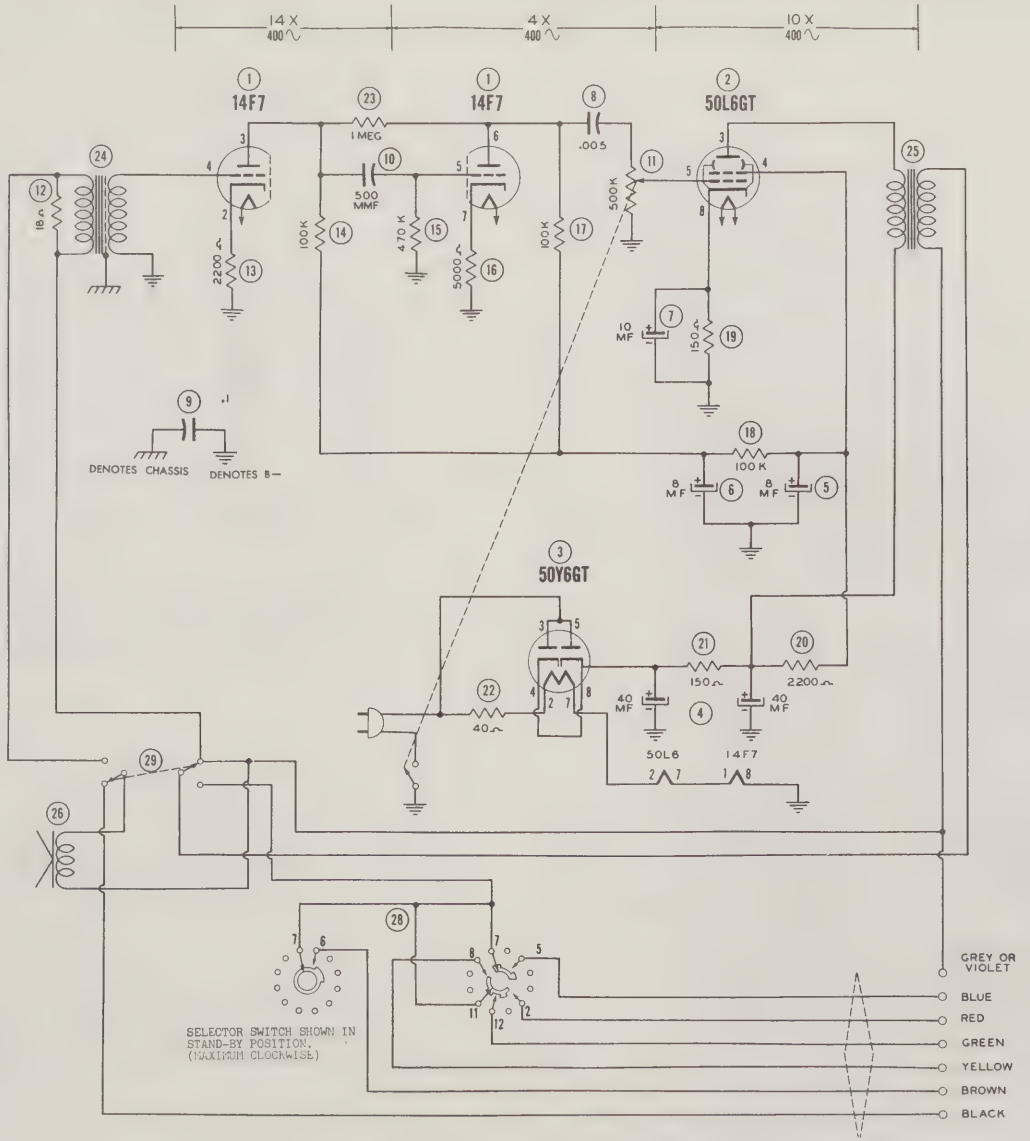
Colors in chart refer to wires in each Master-Station cable.

NOTE: The above instructions cover the installation of a complete six-station system. Should less than six stations be installed the same instructions and chart are used. When using the chart, use only that part of the chart necessary to cover the actual number of stations in the system and the actual number of wires in the interconnecting cable as an example, for a four station system, the chart is used only down to line "D" and across to wire #5. The ends of the unused wires in each master-station cable should be individually taped.

IMPORTANT: The Grey or Violet lead in each Master Station cable should be connected to a good external ground such as a water pipe, radiator, or metal cover plate on wall socket into which IM-5 is plugged.

CHASSIS—BOTTOM VIEW





THE COOPERATION OF THE MANUFACTURER OF THIS
EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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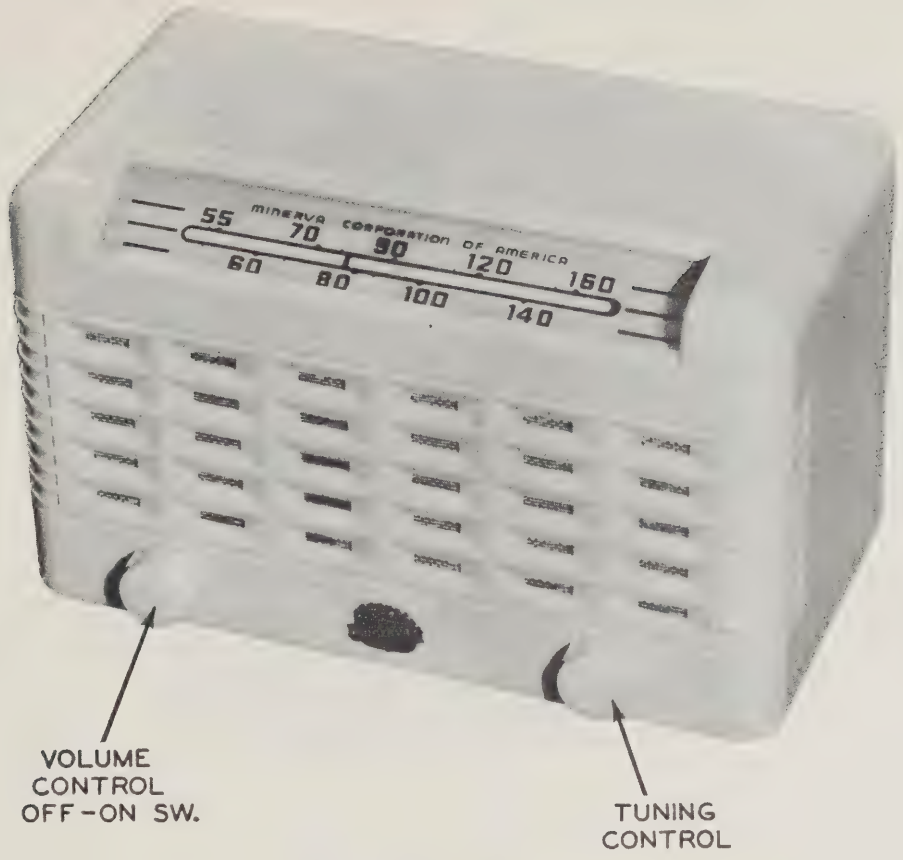

MINERVA MODELS
410, 411

MINERVA MODELS
410, 411

MINERVA MODEL 411

TRADE NAME	Minerva, Models 410, 411
MANUFACTURER	Minerva Corp. of America, 328 William St., New York, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 12SA7GT Converter, 12SK7 IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1640KC RATING .27 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD. capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 12SA7. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD.to reduce hum modulation.
2	200MMFD	High side to external ant. lead. Low side to chassis.	1640KC	"	"	A5	Adjust for maximum output.
3	200MMFD	"	1400KC	Tune for maximum output.	"	A6	" " " "

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MINERVA PART No.	STANDARD REPLACEMENT		
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MINERVA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	40	150	230008	PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Red
B	40	150						" "
6	.05	400	190004	484-05	DT4S5	ST-4-05	TC-15	Line Filter
7	.01	400	190010	484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
8	.01	400	190010	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
9	.1	400	190005	484-.1	DT4P1	ST-4-1	TC-1	AF Plate Decoupling
10	.01	400	190010	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
11	.05	400	190004	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
12	.01	400	190010	484-01	DT4S1	ST-4-01	TC-11	Ext. Ant. Isolation
13	250	500	212035	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
14	250	500	212035	1468-00025	5W5T25	MO.5-325	1FM-325	Diode Filter

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MINERVA PART No.	IRC PART No.	CLAROSTAT PART No.	
15A	1 Meg.	½	3000015	D13-133	M-63-Z	Volume Control-See Note
B	Shaft		Not Req.	A	Not Req.	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

Note-Some models use 500KΩ control same taper.

RESISTORS

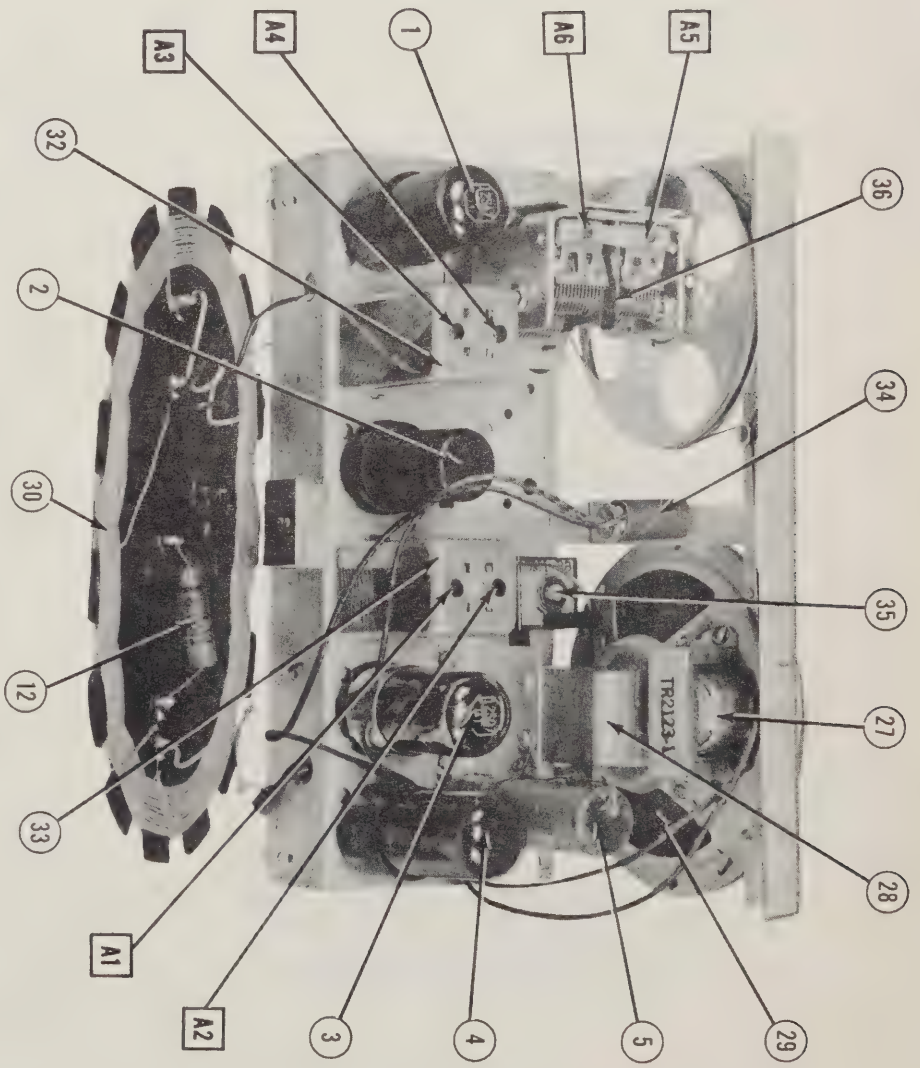
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MINERVA PART No.	IRC PART No.	
16	20KΩ	¼	262203	BTS-22K	Red-Blk.-Or. Oscillator Grid
17	2.2 Meg.	¼	262225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
18	10 Meg.	¼	262106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
19	330KΩ	¼	262334	BTS-330K	Or.-Or.-Yl. AF Plate Load
20	47KΩ	¼	262473	BTS-47K	Yl.-Vi.-Or. AF Plate Decoupling
21	470KΩ	¼	262474	BTS-470K	Yl.-Vi.-Yl. Output Grid
22	150Ω	¼	282151	BW-½-150	Br.-Grn.-Br. Output Cathode
23	500Ω	2	292501	BT-2-470	Grn.-Blk.-Br. Filter
24	30Ω	2	292300	BW-2-33	Or.-Blk.-Blk. Surge Limiter
25	200Ω	10		AB-200	Line Dropping
26	30Ω	2	292300	BW-2-33	Or.-Blk.-Blk. Pilot Light Shunt-See Note

Note-Used in Model 411 only.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MINERVA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
27	2000Ω	3.4Ω	174Ω	.6Ω	Part of 185005	A-3876	T22845	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA MINERVA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-105*		
28	PM	3.4Ω	185005	Mod. PS-X	5A15*	*Drill and tap magnet frame.
	CONE DIA.	VC DIA.				
29	4-5/8"	1/2"				

R F COILS

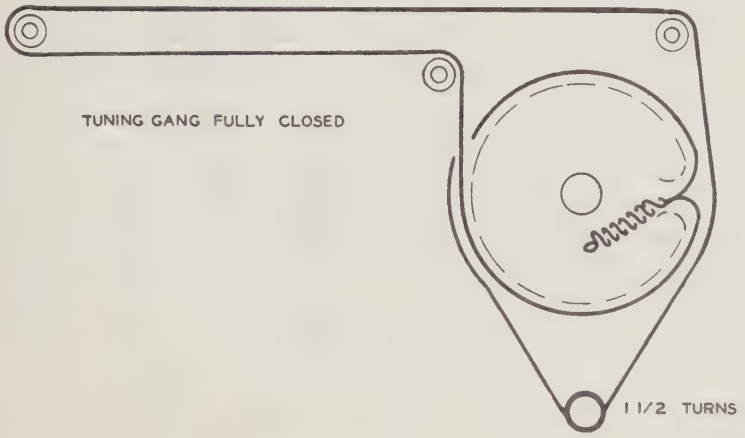
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MINERVA PART No.	MEISSNER PART No.
30	Loop Ant.	.2Ω	1.4Ω	247001	
31	Osc. Coil		2.8Ω	248008	14-1060
32	Input IF	21Ω	21Ω	305002	16-6662
33	Output IF	21Ω	20Ω	305003	16-6663

DIAL LIGHT

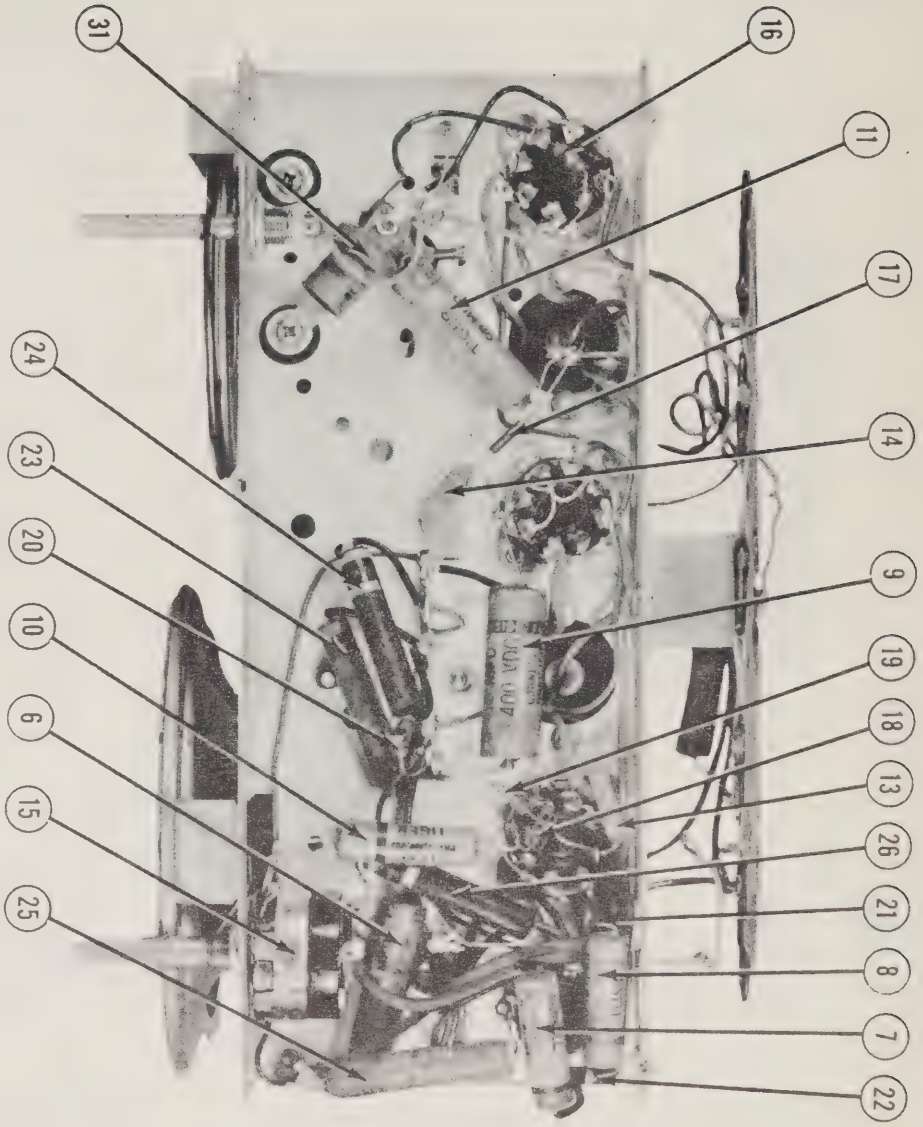
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA MINERVA PART No.		INSTALLATION NOTES
34	Bayonet	6-8	0.15	Brown	316011		Type 47 Model 411 only

MISCELLANEOUS

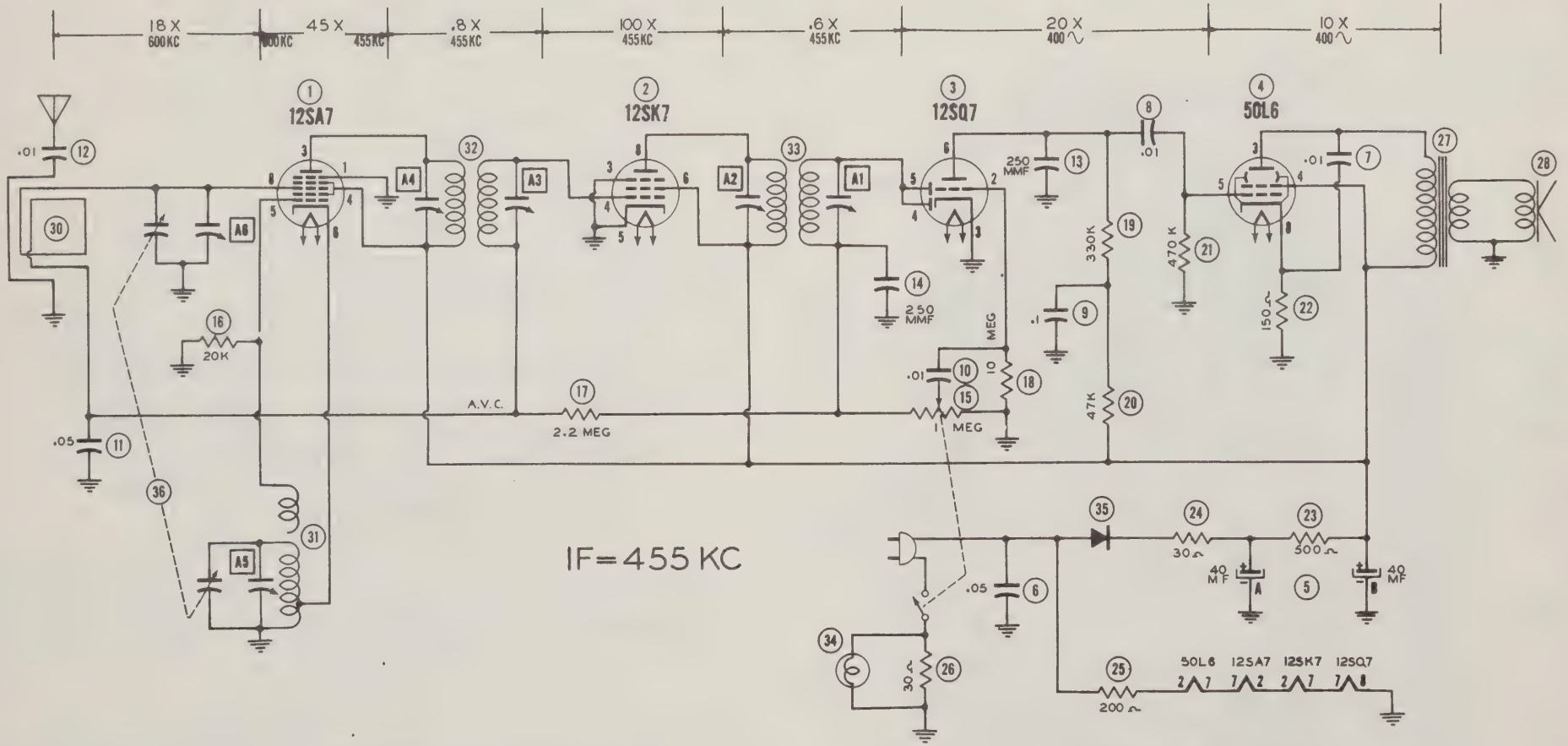
ITEM No.	PART NAME	MINERVA PART No.	NOTES
35	Rectifier	730001	Selenium
36	2 Gang Var. Cap	235003	(39-412 MMF, 31-182MMF)
	Dial Pointer	346007	



CHASSIS—BOTTOM VIEW



DATE 5/48-#4311-14 SET #41-FOLDER #14



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	23VAC	95VDC	95VDC	-11VDC§	0V.	35VAC	-.4VDC
2	12SK7	0V.	23VAC	0V.	-.4VDC	0V.	95VDC	11VAC	95VDC
3	12SQ7GT	0V.	-.7VDC	0V.	-.6VDC	-.6VDC	62VDC	11VAC	0V.
4	50L6GT	0V.	85VAC	90VDC	95VDC	0V.	0V.	35VAC	5.8VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0Ω	25Ω	25KΩ	25KΩ	20KΩ	.5Ω	38Ω	3.2 Meg.
2	12SK7	0Ω	25Ω	0Ω	3.2 Meg.	0Ω	25KΩ	12Ω	25KΩ
3	12SQ7GT	0Ω	10 Meg.	0Ω	1 Meg.	1 Meg.	400KΩ	12Ω	0Ω
4	50L6GT	INF.	87Ω	25KΩ	25KΩ	470KΩ	INF.	38Ω	150Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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4811-14

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MOLDED INSULATION (WIRETONE)
MODEL MR-6

MOLDED INSULATION (WIRETONE)
MODEL MR-6

MOLDED INSULATION MODEL MR-6

TRADE NAME	Molded Insulation (WireTone) Model MR-6
MANUFACTURER	Molded Insulation Co., 335 Price St., Philadelphia 4, Pa.
TYPE SET	AC Operated Combination Phono Player-Wire Recorder-Superheterodyne Receiver
TUBES (SEVEN)	Types, 12SA7GT Converter, 12SK7 IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 12SJ7 Pre-Amp., 50L6GT Bias Osc., 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .44 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD. capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	200MMFD	High side to ant. lead. Low side to chassis.	1600KC	"	"	A5	Adjust for maximum output.
3	200MMFD	"	1400KC	Tune for maximum output.	"	A6	" " " "

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOLDED INSULATION PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Pre-Amp.	12SJ7	12SJ7	8N	
6	Bias Osc.	50L6GT	50L6GT	7AC	
7	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOLDED INS. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	50	150		AF106D20A*	UP5315	DY-5030-150	EL-35	■ Filter
B	30	150						▲ "
9	80	150		AF106D20A*†	UP5315	DY-5030-150	EL-35†	Pre-Amp. Decoup.
10	25	25		PRS25-25	BR252A	M-25-25	TA-25	Output Cathode Bypass
11	25	25		PRS25-25	BR252A	M-25-25	TA-25	Pre-Amp. Cathode Bypass
12	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
13	.05	400		484-05	DT4S5	ST-4-05	TC-15	Tone Compensation
14	.01	400		484-01	DT4S1	ST-4-01	TC-11	Rec. Ind. Coupling
15	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
16	.002	600		684-002	DT6D2	ST-6-002	TC-22	" "
17	.02	400		484-02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
18	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
19	.0005	600		1468-0005	DT6T5	ST-6-0005	TC-35	AF Plate Bypass
20	.002	600		684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
21	.05	200		484-05	DT4S5	ST-4-05	TC-15	AVC Filter
22	.25	200		484-25	DT4P25	ST-4-25	TC-2	Line Isolation
23	.002	600		684-002	DT6D2	ST-6-002	TC-22	Ant. Isolation
24	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
25	.1	200		484-.1	DT4P1	ST-4-.1	TC-1	" "
26	.05	200		484-05	DT4S5	ST-4-05	TC-15	Pre-Amp. Screen Bypass
27	.01	400		484-01	DT4S1	ST-4-01	TC-11	Erase Osc. Grid Cap.
28	.02	400		484-02	DT4S2	ST-4-02	TC-12	Fixed Trimmer
29	.1	200		484-.1	DT4P1	ST-4-.1	TC-1	RF Bypass Power Supply
30	.1	200		484-.1	DT4P1	ST-4-.1	TC-1	RF Bypass
31	.05	200		484-05	DT4S5	ST-4-05	TC-15	Erase Osc. Plate Bypass
32	250	500		1468-00025	SW5T25	MO.5-325	1FM-325	Diode Filter

*Omit bypass section.
†Parallel sections to obtain desired capacity.

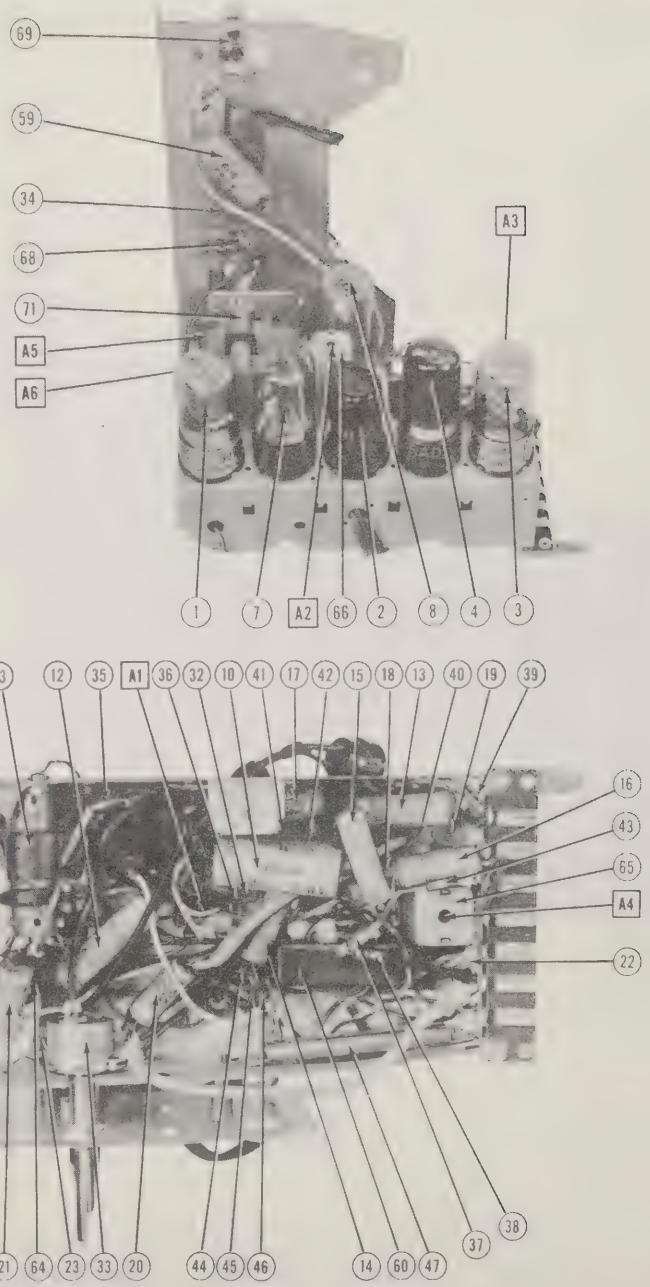
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOLDED INS. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
33A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 33A per instructions
C	Switch			41	SW-A	" " " "
34A	250KΩ	½		D11-130	M-55-S	Tone Control
B	Shaft			A	Not Req.	Attach to 34A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOLDED INSULATION PART No.	IRC PART No.	IDENTIFICATION CODES
35	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
36	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
37	51KΩ	½		BTS-47K	Grn.-Br.-Or. Diode RF Filter
38	750Ω	½		BTS-680	Vi.-Grn.-Br. Diode Load

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOLDED INSULATION PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
39	4.1 Meg.	½		BTS-4.7 Meg.	Grn.-Br.-Grn. AF Grid
40	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
41	510KΩ	½		BTS-470K	Grn.-Br.-Yl. Output Grid
42	150Ω	1		BW-1-150	Br.-Grn.-Br. Output Cathode
43	82KΩ	½		BTS-82K	Gray-Red-Or. Tone Compensation-See Note 1
44	220KΩ	½		BTS-220K	Red-Red-Yl. Indicator Voltage Dropping
45	220KΩ	½		BTS-220K	Red-Red-Yl. Bleeder
46	270KΩ	½		BTS-270K	Red-Vi.-Yl. Series Indicator
47	200Ω	10		AB-200	Line Dropping
48	140Ω	5		ABA-150	" -See Note 2
49	22KΩ	½		BTS-22K	Red-Red-Or. Erase Oscillator Grid
50	330Ω	½		BW-½-330	Or.-Or.-Br. Parasitic Suppressor
51	24KΩ	½		BTS-22K	Red-Yl.-Or. Pre-Amp. Decoupling
52	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Pre-Amp. Screen Dropping
53	270KΩ	½		BTS-270K	Red-Vi.-Yl. Pre-Amp. Plate Load
54	1500Ω	½		BTS-1500	Br.-Blue-Red Pre-Amp. Cathode
55	510KΩ	½		BTS-470K	Grn.-Br.-Yl. Pre-Amp. Grid
56	51KΩ	½		BTS-47K	Grn.-Br.-Or. Series Phono
57	750Ω	½		BTS-680	Vi.-Grn.-Br. Phono Shunt
58	3.3Ω	½		BW-½-3.3	Or.-Or.-Gold Output Transformer Load

Note 1-Some models use 75KΩ in this application.
Note 2-On IRC replacement set slider at 140Ω from one end.

FILTER CHOKE

ITEM NO.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA MOLDED INSULATION PART NO.	REPLACEMENT DATA STANCOR PART NO.	REPLACEMENT DATA THORDARSON PART NO.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
59	.07A	300Ω	3.3 Henries				C-2975	

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA MOLDED INSULATION PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDARSON PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
60	18000Ω	3.5Ω	145Ω	.4Ω		A-3876	T22S45	A-2928	

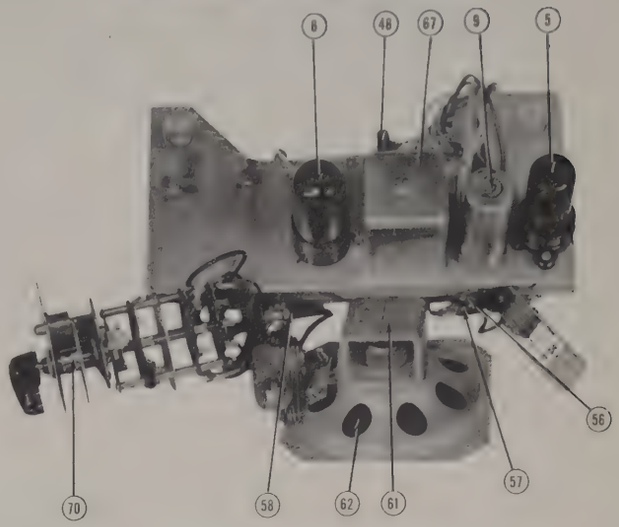
SPEAKER

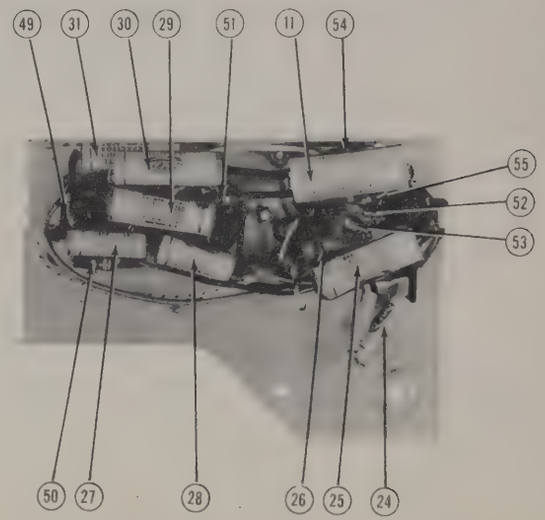
ITEM No.	RATINGS		REPLACEMENT DATA MOLDED INSULATION PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113		
61	PM	3.5Ω		Mod. P4-X	4A07	
	CONE DIA.	VC DIA.				
62	4"	1/2"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MOLDED INSULATION PART No.	REPLACEMENT DATA MEISSNER PART No.	
63	Ant. Coil	23Ω	4Ω		14-1056	
64	Osc. Coil		5.5Ω		14-1060	Add 50MMFD from osc. grid to high side tuning cap.
65	Input IF	20Ω	20Ω		16-6678	
66	Output IF	20Ω	20Ω		16-6678	
67	Erase Osc.	.6Ω	2Ω			

CHASSIS—BOTTOM VIEW





PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

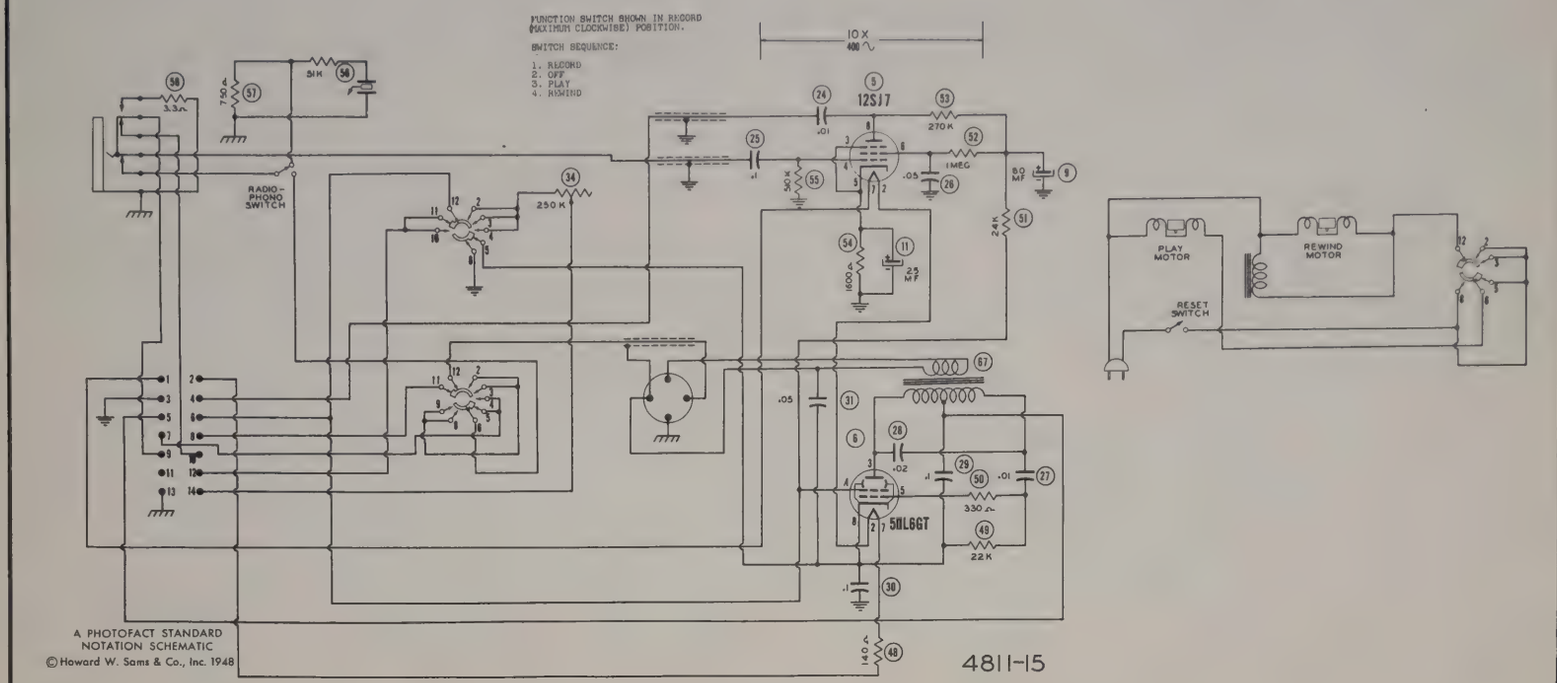
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA MOLDED INSULATION PART No.		INSTALLATION NOTES
68	Bayonet	6-8	0.15	Brown			Type 47

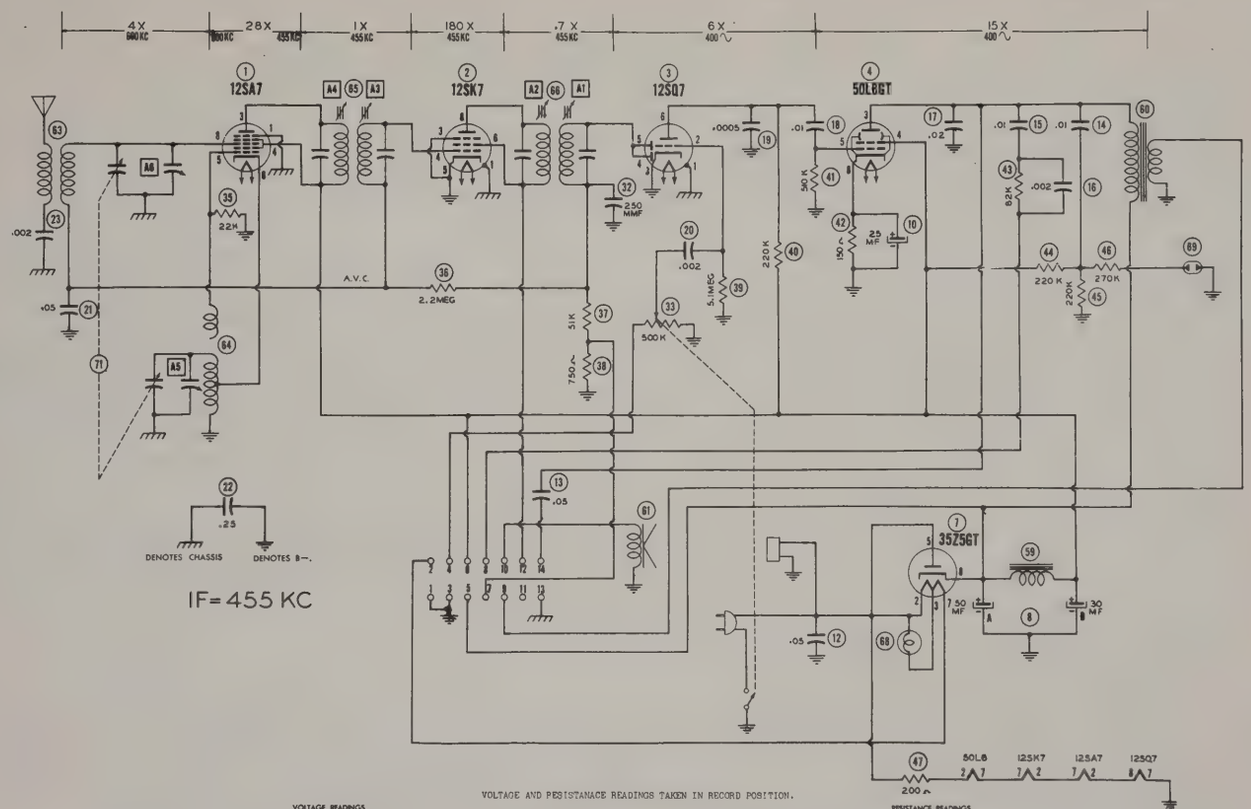
MISCELLANEOUS

ITEM No.	PART NAME	MOLDED INSULATION PART No.	NOTES
69	Lamp.		Neon Indicator
70	Switch		Function
71	2 Gang Var. Cap.		(26-375MMF, 37-195MMF)

DISASSEMBLY INSTRUCTIONS

1. Remove two push-on type control knobs.
2. Remove push-on type tuning knob.
3. Remove four Phillips head screws from plastic chassis covers at each end of cabinet. Remove covers from cabinet.
4. Remove power supply plug from tuning chassis.
5. Disconnect motor plug.
6. Remove four screws holding tuning chassis in cabinet.
7. Unsolder leads from speaker.
8. Unsolder leads from volume control.
9. Remove tuning chassis from cabinet.
10. Remove four screws holding recorder chassis in cabinet.
11. Remove plug from recording head.
12. Remove leads from crystal pickup.
13. Remove microphone switch from recorder.
14. Remove record player switch from recorder.
15. Remove recorder chassis from cabinet.





VOLTAGE AND RESISTANCE READINGS TAKEN IN RECORD POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	13VAC	112VDC	112VDC	-17VDC‡	0V.	27VAC	-.5VDC
2	12SK7	0V.	27VAC	0V.	-.5VDC	0V.	95VDC	40VAC	95VDC
3	12SQ7GT	0V.	0V.	0V.	-.4VDC	-.4VDC	50VDC	0V.	13VAC
4	50L6GT	0V.	95VAC	110VDC	95VDC	0V.	-.4VDC	40VAC	7VDC
5	12SJ7	0V.	12VAC	.6VDC	-.1VDC	.6VDC	13VDC	0V.	11VDC
6	50L6GT	0V.	12VAC	120VDC	105VDC	-27VDC	-27VDC	65VAC	0V.
7	35Z5GT	-.4VDC	117VAC	115VAC	110VDC	117VAC	0V.	88VAC	125VDC

‡TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	INF.	13Ω	100KΩ	100KΩ	22KΩ	1Ω	24Ω	2.2 Meg.
2	12SK7	INF.	24Ω	0Ω	2.2 Meg.	0Ω	100KΩ	33Ω	100KΩ
3	12SQ7GT	INF.	5 Meg.	0Ω	51KΩ	51KΩ	330KΩ	0Ω	13Ω
4	50L6GT	INF.	65Ω	100KΩ	100KΩ	510KΩ	51KΩ	33Ω	150Ω
5	12SJ7	INF.	12Ω	1.7KΩ	560KΩ	1.7KΩ	1.1 Meg	0Ω	390KΩ
6	50L6GT	INF.	11Ω	100KΩ	100KΩ	22KΩ	22KΩ	50Ω	0Ω
7	35Z5GT	2.5 Meg.	118Ω	118Ω	100KΩ	140Ω	0Ω	115Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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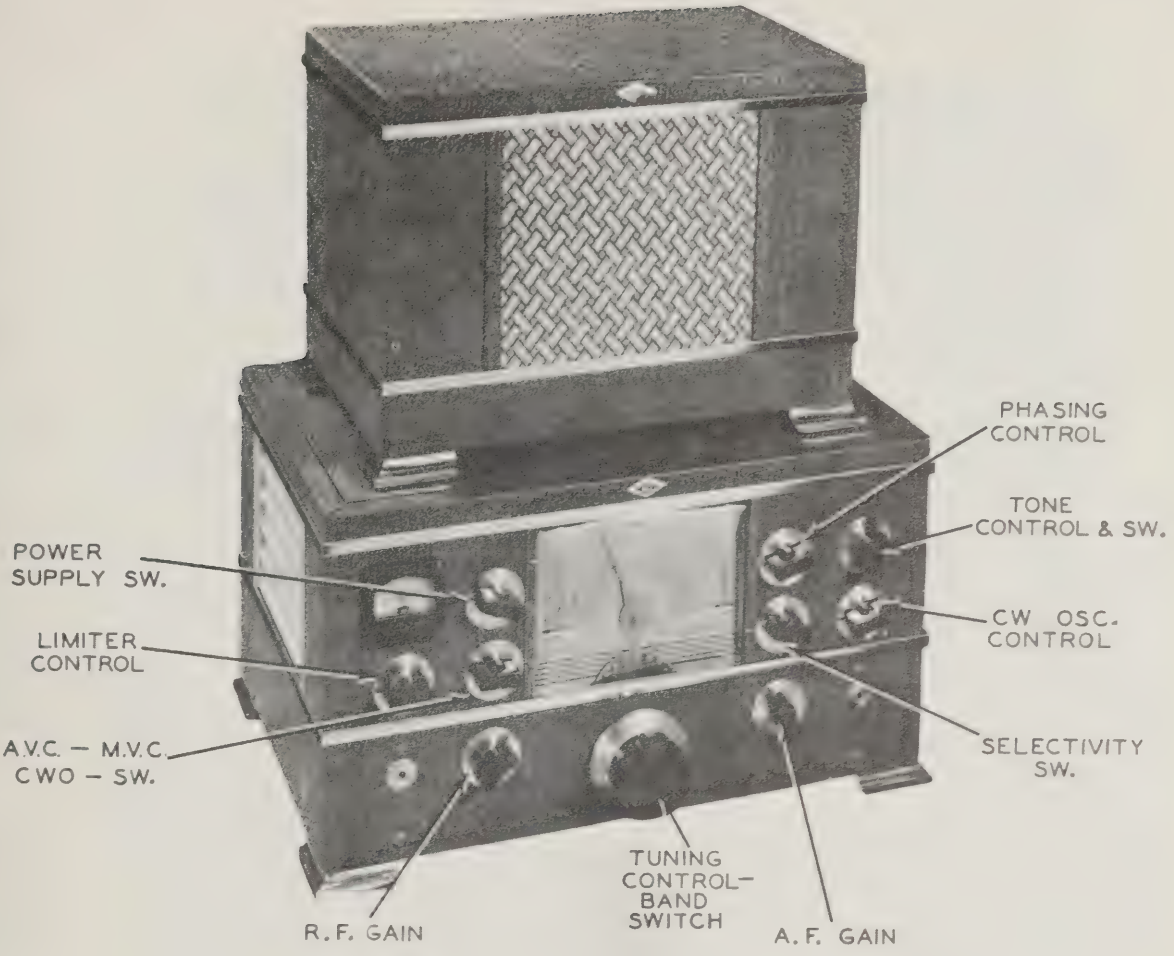
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

NATIONAL MODELS
NC-2-40DR, NC-2-40DT



NATIONAL MODELS
NC-2-40DR, NC-2-40DT

NATIONAL MODEL NC-2-40DR

TRADE NAME	National, Model NC-2-40DR, NC-2-40DT
MANUFACTURER	National Co., Inc., 61 Sherman St., Malden, Mass.
TYPE SET	AC Operated Communication Six Band Superheterodyne Receiver
TUBES (TWELVE)	Types, 6SK7 RF Amp., 6K8 Mixer, 6J5 Osc., 6K7 1st IF Amp., 6SK7 2nd IF Amp., 6SL7GT 2nd Det.-Limiter, 6SJ7 CW-Osc., 6V6GT AVC, 6SN7GT AF-Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts or 220-240 Volts AC RATING .75 Amp. @ 117 Volts AC
TUNING RANGE	480-1040KC, 920-2100KC, 1.68-4.05MC, 3.4-4.05MC, 3.4-7.4MC, 6.9-7.35MC, 6.65-14.6MC, 13.8-14.46MC, 13.9-31MC, 26.9-30.05MC.

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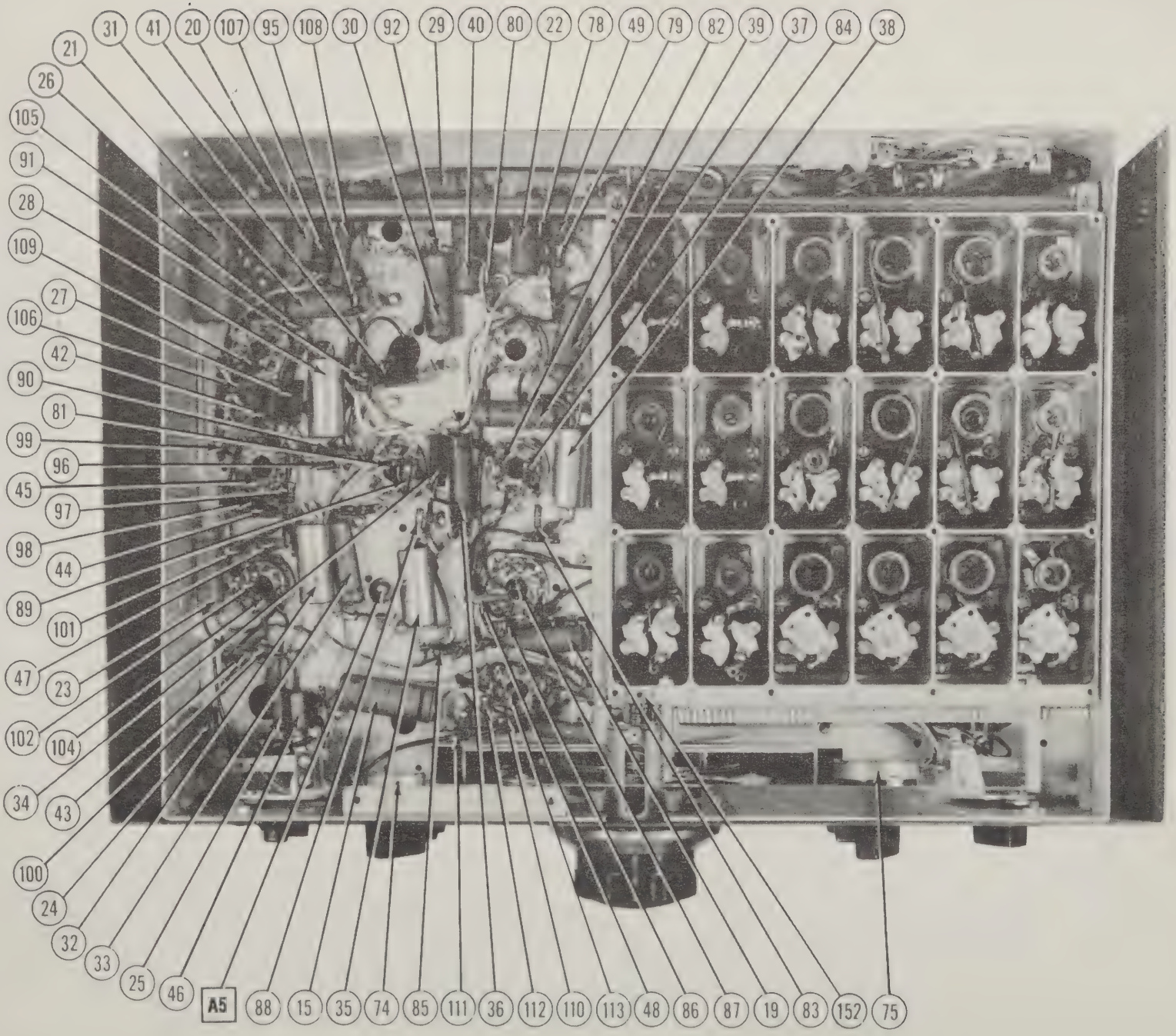
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6SK7	6SK7	8N	
2	Mixer	6K8	6K8	8K	
3	Osc.	6J5	6J5	6Q	
4	1st IF	6K7	6K7	7R	
5	2nd IF	6SK7	6SK7	8N	
6	2nd Det.-Limiter	6SL7GT	6SL7GT	8BD	
7	CW Osc.	6SJ7	6SJ7	8N	
8	AVC	6V6GT	6V6GT	7AC	
9	AF Phase Inv.	6SN7GT	6SN7GT	8BD	
10	Power Output	6V6GT	6V6GT	7AC	
11	" "	6V6GT	6V6GT	7AC	
12	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
13A	8	475		GL-475-8-8	KR588A	DY-2x8-450	EL-1	Filter-Red
B	8	475					WR-8	" -Red-White
14	40	200		GL450-40	KR530	DY-50-350	EL-42	Bias Filter
15	10	50		PRS50-10	BR105	M-10-50	TA-510	Inverter Cathode Bypass
16	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Power Supply Bypass
17	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Audio Coupling
18	.1	400		484-.1	DT4P1	ST-4-1	TC-1	" "
19	.1	400		484-.1	DT4P1	ST-4-1	TC-1	" "
20	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Bias Network
21	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AVC Network
22	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AVC Filter
23	.1	400		484-.1	DT4P1	ST-4-1	TC-1	CW Osc. Screen Bypass
24	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
25	.01	600		684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
26	1	200		484-1	DT2W1	SDH-2-1M	TC-10	Audio Coupling
27	.01	600		684-01	DT6S1	ST-6-01	TC-11	Det. Plate Bypass
28	.1	600		684-.1	DT6P1	ST-6-1	TC-1	2nd IF Plate Decoup.
29	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
30	.1	400		484-.1	DT4P1	ST-4-1	TC-1	2nd IF Cathode Bypass
31	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
32	.1	600		684-.1	DT6P1	ST-6-1	TC-1	1st IF Plate Decoup.
33	.1	400		484-.1	DT4P1	ST-4-1	TC-1	1st IF Cathode Bypass
34	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
35	.1	600		684-.1	DT6P1	ST-6-1	TC-1	Conv. Plate Decoup.
36	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Conv. Screen Bypass
37	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Conv. Cathode Bypass
38	.1	600		684-.1	DT6P1	ST-6-1	TC-1	RF Plate Decoupling
39	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Screen Bypass
40	.1	400		484-.1	DT4P1	ST-4-1	TC-1	RF Cathode Bypass
41	.1	400		484-.1	DT4P1	ST-4-1	TC-1	RF Bypass
42	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	AVC Filter
43	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	RF Bypass-Cer.
44	1000	500		1467-001	1W5D1	MW.5-21	1FM-21	" "
45	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	" " "
46	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	Tone Comp.
47	2	500						CW Osc. Coup. -Cer.
48	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Osc. Grid Cap.-Cer.
49	5000	300		1467-005	1D5D5	MW.5-25	1FM-25	AVC Filter
50	750	500						"A" Band Osc. Padder
51	3000	500						"B" " " "
52	1700	500						"C" " " "
53	900	500						"D" " " "
54	1500	500						"E" " " " -Cer.
55	250	500						"F" " " " "
56	29	500						"A" " " " "
57	12	500						"B" " " " "
58	18	500						"C" " " " "
59	35	500						"D" " " " "
60	10	500						"A" Band Fixed Trim. "
61	10	500						"B" " " " "
62	10	500						"C" " " " "
63	29	500						"A" " Osc. Feedback "
64	38	500						"A" " RF Padder "

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: NATIONAL PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
118	.093A	280Ω	12.5 Henries		C-2305*	T20C54*	C-3193*	*Drill new mounting holes.
119	.093A	280Ω	12.5 "		C-2305*	T20C54*	C-3193*	*Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
120	9500Ω CT	7.5Ω	480Ω CT	.4Ω		A-3831	T-22856	A-2901	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-120	10A6	
121	PM	7.5Ω		Mod. P10-S		
	CONE DIA.	VC DIA.				
122	9-3/4"	7/8"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: MEISSNER PART No.
	BAND				
123	Ant.Coil F	.7Ω	3.4Ω		
124	" " E	1.6Ω	.7Ω		
125	" " D	.6Ω	.3Ω		
126	" " C	.3Ω	.2Ω		
127	" " B	.2Ω	.2Ω		
128	" " A	.1Ω	.1Ω		
129	RF Coil F	.3Ω	2.9Ω		
130	" " E	32.2Ω	1.4Ω		
131	" " D	14.4Ω	.7Ω		
132	" " C	7.7Ω	.3Ω		
133	" " B	2.9Ω	.2Ω		
134	" " A	.2Ω	.1Ω		
135	Osc.Coil F	1.2Ω	1.4Ω		
136	" " E	.7Ω	1.3Ω		
137	" " D	1.2Ω	.7Ω		
138	" " C	.3Ω	.2Ω		
139	" " B	.2Ω	.2Ω		
140	" " A	.6Ω	1.2Ω		
141	Input IF	12.3Ω	9.5Ω		
142	Inter.. If	7.8Ω	7.8Ω		
143	Output IF	7Ω	7.6Ω		
144	Osc. Trans		1.2Ω		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA	INSTALLATION NOTES
145	Screw	6-8	0.15	Brown	No. 40		Type 40
146-147	Bayonet	6-8	0.15	"	No. 47		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
148	Switch		On-Off
149	"		B+ On-Off
150	"		AVC-MVC-CWO
151	"		Selectivity
152	"		Band
153	Fuse		2 Amp.
154	"		1 Amp.
155	3 Gang Var. Cap		(31-260MMF) each section
156	Switch		Line Voltage (110-120V to 220-240V)

PARTS LIST AND DESCRIPTIONS (Continued)

65	15.5	500						"B" " " " " "
66	21	500						"C" " " " " "
67	38.5	500						"D" " " " " "
68	16	500						"A" " RF Coupling
69	38	500						"A" " Padder
70	15.5	500						"B" " " " " "
71	21	500						"C" " " " " "
72	38.5	500						"D" " " " " "
73	900	500						"A" " "

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	
74A	500KΩ	½		D13-133	M-60-Z	AF Gain Control
B	Shaft			A	Not Req.	Attach to 74A per instructions
75	10KΩ	1½				RF Gain Control
76	10KΩ	1½				Limiter Control
77A	500KΩ	½		D11-133	M-58-S	Tone Control
B	Shaft			A	Not Req.	Attach to 77A per instructions
C	Switch			41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	
78	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. AVC Network
79	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
80	470Ω	½		BTS-470	Yl.-Vi.-Br. AVC Cathode
81	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Voltage Dropping
82	220Ω	½		BW-½-220	Red-Red-Br. Converter Cathode
83	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Converter Screen Dropping
84	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Bleeder
85	2200Ω	½		BTS-2200	Red-Red-Red Decoupling
86	47KΩ	1		BTA-47K	Yl.-Vi.-Or. Voltage Dropping
87	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Converter Grid
88	22KΩ	½		BTS-22K	Red-Red-Or. AVC Network
89	1500Ω	½			Br.-Grn.-Red 1st IF Cathode-See Note
90	2200Ω	½		BTS-2200	Red-Red-Red 1st IF Decoupling
91	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
92	1000Ω	½			Br.-Blk.-Red 2nd IF Cathode-See Note
93	22KΩ	2		BT-2-22K	Red-Red-Or. Bleeder
94	22KΩ	2		BT-2-22K	Red-Red-Or. Voltage Dropping
95	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoupling
96	2200Ω	½		BTS-2200	Red-Red-Red Detector Plate Decoupling
97	4700Ω	½		BTS-4700	Yl.-Vi.-Red Detector Cathode
98	22KΩ	½		BTS-22K	Red-Red-Or. Detector Output Load
99	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Limiter Cathode
100	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Limiter Grid
101	220KΩ	½		BTS-220K	Red-Red-Yl. BFO Plate Load
102	100KΩ	½		BTS-100K	Br.-Blk.-Yl. BFO Screen Dropping
103	220Ω	2		BW-2-220	Red-Red-Br. Output Cathode
104	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Bleeder
105	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
106	15KΩ	½		BTS-15K	Br.-Grn.-Or. " "
107	2700Ω	2		BT-2-2700	Red-Vi.-Red Bias Network
108	820Ω	2		BT-2-820	Gray-Red-Br. " "
109	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
110	47KΩ	½		BTS-47KΩ	Yl.-Vi.-Or. AF Plate Load
111	1000Ω	½		BTS-1000	Br.-Blk.-Red AF Cathode
112	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Phase Inverter Plate Load
113	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Phase Inverter Grid
114	220KΩ	½		BTS-220K	Red-Red-Yl. Output Grid
115	220KΩ	½		BTS-220K	Red-Red-Yl. " "
116	220KΩ	½		BTS-220K	Red-Red-Yl. " "

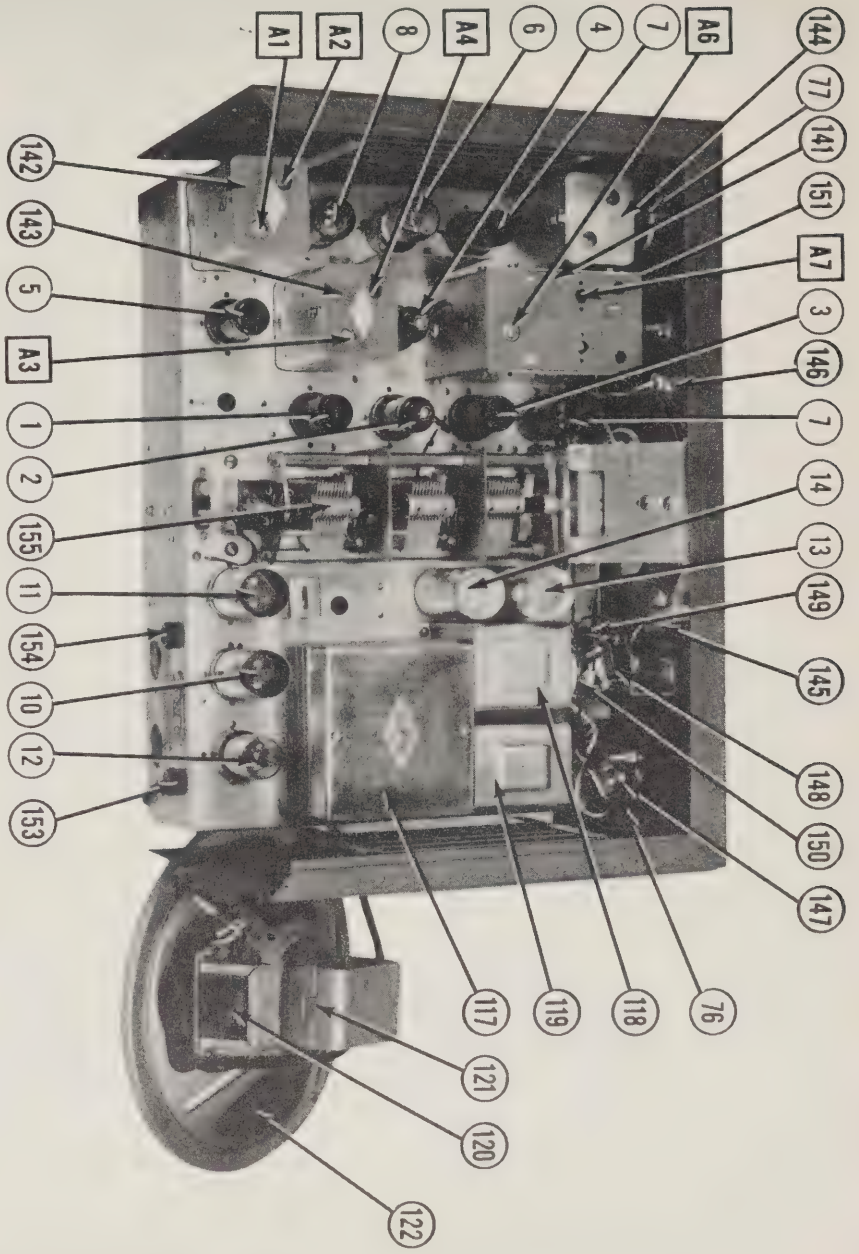
Note-This resistor is selected individually for each receiver and should be replaced according to the value used.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	NATIONAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
117	117V AC @ .75A or 230V AC	800V CT @ .093A	5.0V AC @ 2.0A	6.4VAC @ 4.7A		P-6165#		

#This replacement for 117V AC only.

CHASSIS—TOP VIEW



NATIONAL MODELS
NC-2-40DR, NC-2-40DT PAGE 5

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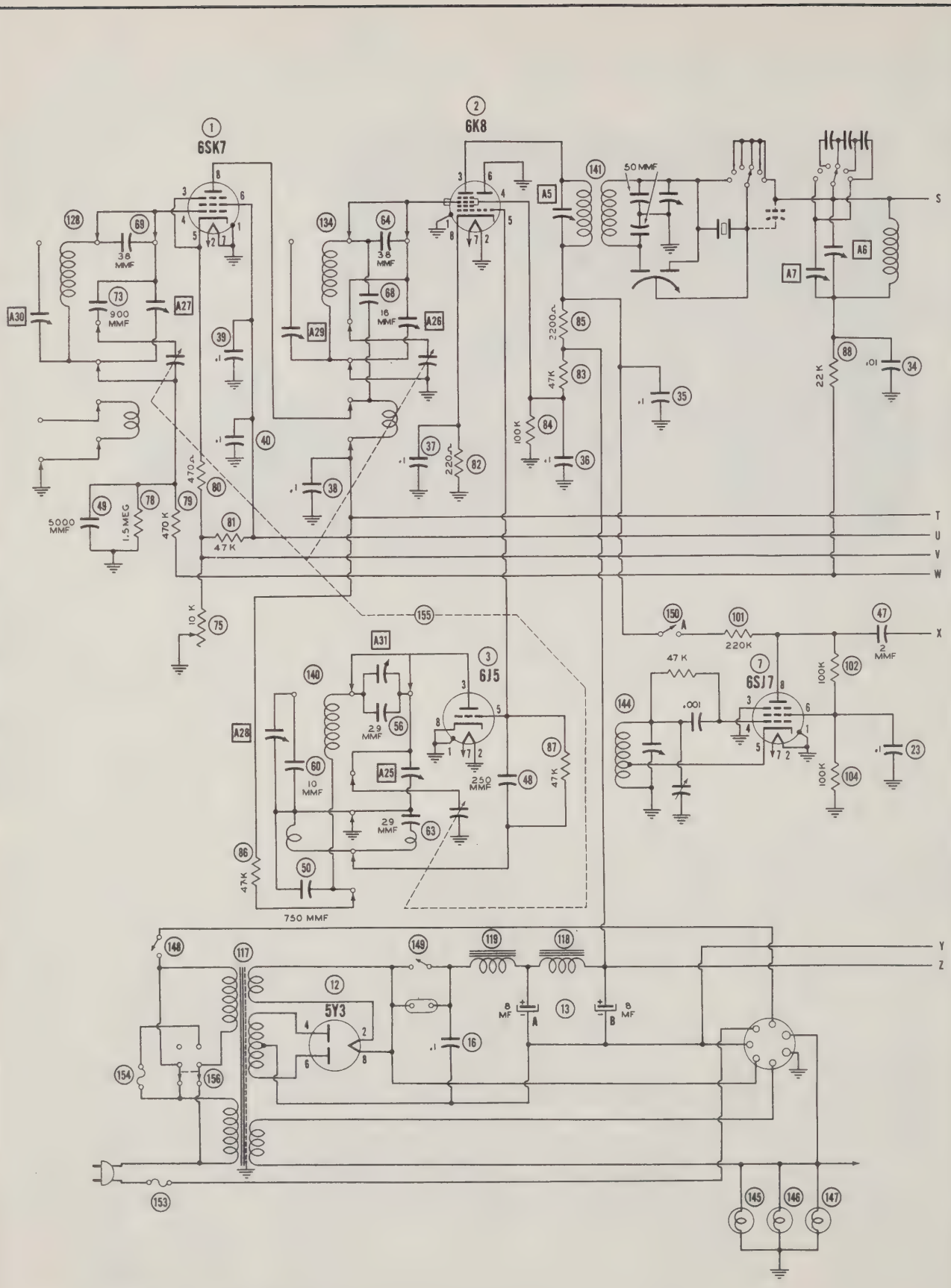

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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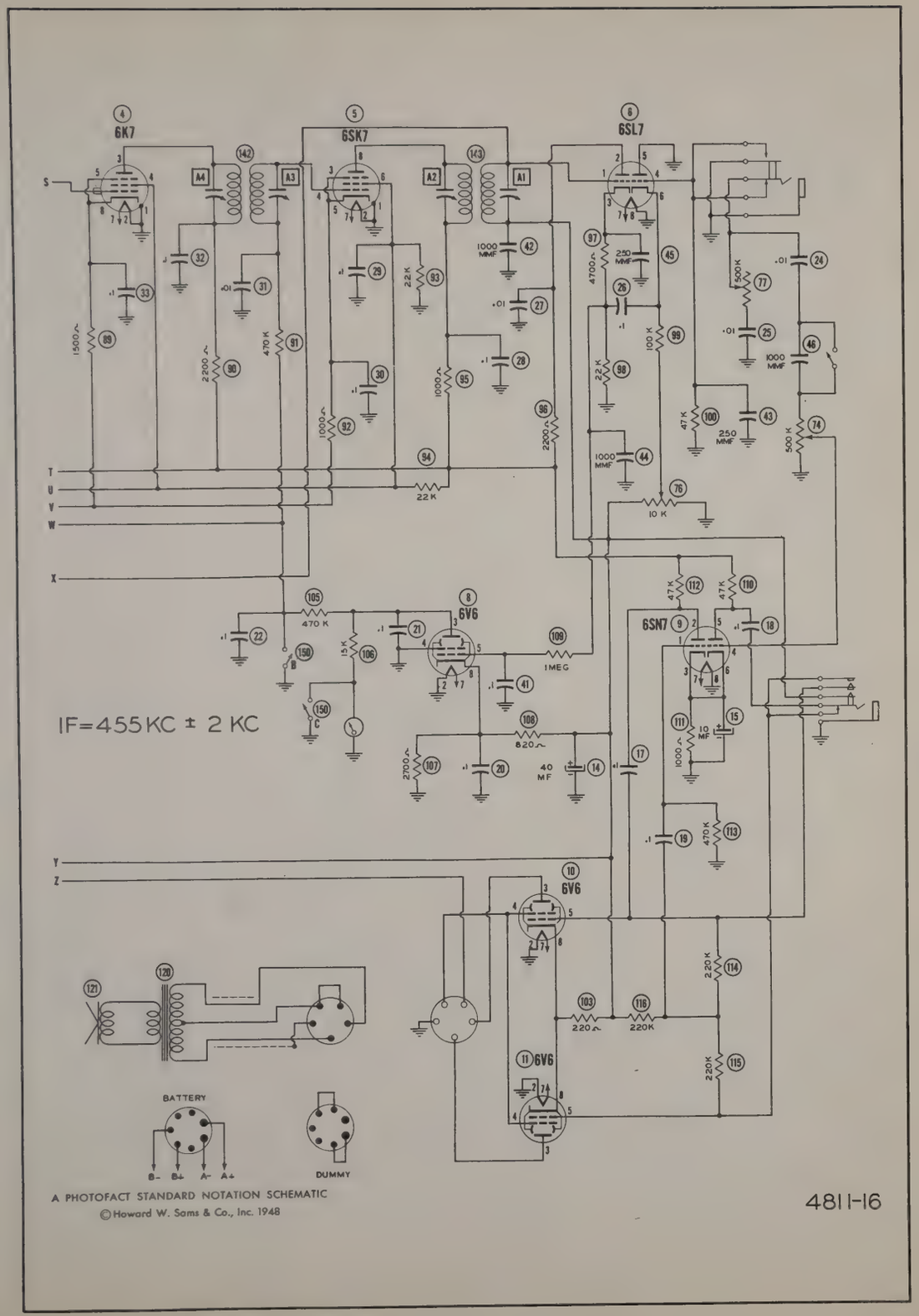
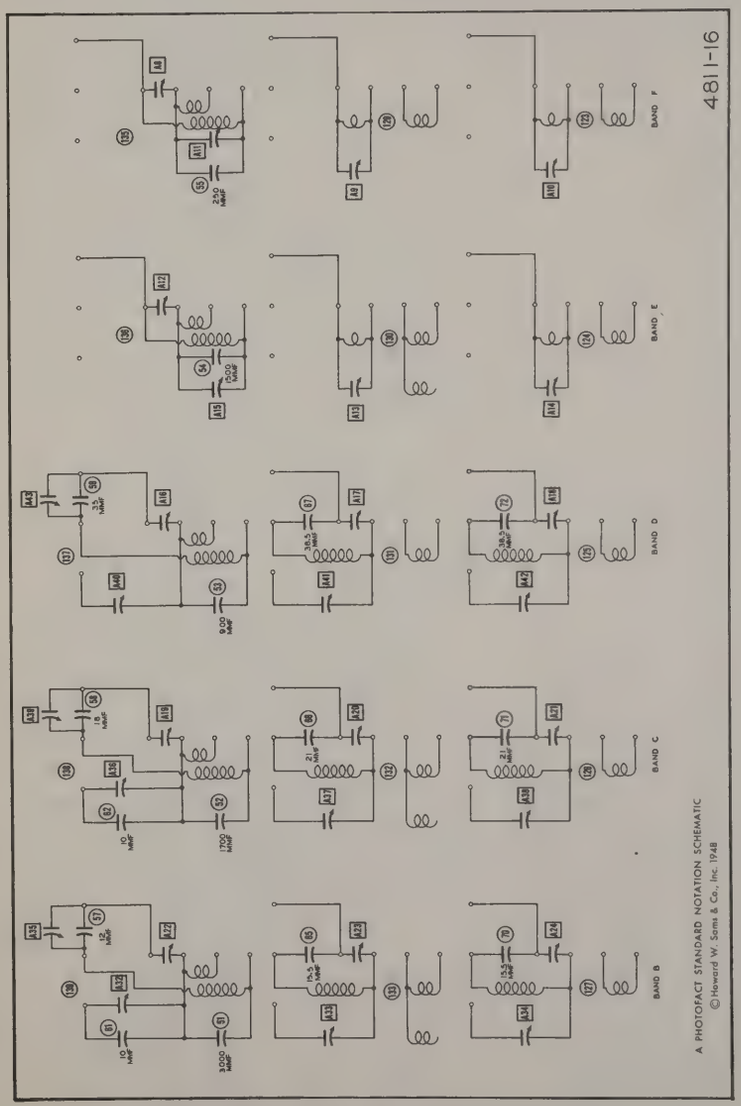


STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	14X	600KC
RF GRID TO CONV. GRID	1.5X	600KC
CONVERSION GAIN	25X	IN 600KC OUT 455KC ± 2%
1st IF TRANSFORMER	.1X	455KC ± 2%
1st IF TUBE	100X	455KC ± 2%
2nd IF TRANSFORMER	.6X	455KC ± 2%
2nd IF TUBE	45X	455KC ± 2%
3rd IF TRANSFORMER	.3X	455KC ± 2%
AUDIO	30X	400 ∿
OUTPUT	20X	400 ∿



The stage gain measured values listed above approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6SK7	0V.	64VAC	2.2VDC	0V.	2.2VDC	60VDC	0V.	20OVDC	-
2	6K8	0V.	0V.	197VDC	47VDC	-8VDC§	0V.	6.4VAC	.5VDC	0V.
3	6J5	0V.	0V.	72VDC	117VDC	-8VDC§	0V.	6.4VAC	0V.	-
4	6K7	0V.	0V.	190VDC	60VDC	3.2VDC	0V.	6.4VAC	3.2VDC	0V.
5	6SK7	0V.	0V.	3VDC	0V.	3VDC	60VDC	6.4VAC	190VDC	-
6	6SL7GT	-52VDC	200VDC	-47VDC	-.2VDC	0V.	.3VDC	6.4VAC	0V.	-
7	6SJ7	0V.	0V.	0V.	-3VDC§	0V.	15VDC	6.4VAC	50VDC	-
8	6V6GT	0V.	0V.	0V.	0V.	-25VDC	0V.	6.4VAC	-35VDC	-
9	6SN7GT	0V.	110VDC	4VDC	0V.	90VDC	4VDC	6.4VAC	0V.	-
10	6V6GT	0V.	0V.	185VDC	190VDC	-60VDC§	0V.	6.4VAC	-48VDC	-
11	6V6GT	0V.	0V.	182VDC	190VDC	-60VDC§	-5.5VDC	6.4VAC	-48VDC	-
12	5Y3GT	0V.	240VDC	0V.	400VAC	0V.	400VAC	0V.	240VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

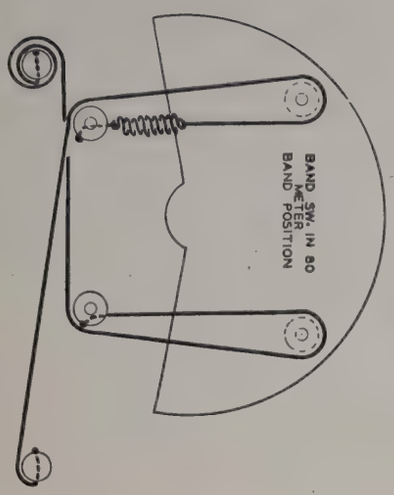
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6SK7	1MΩ	.1Ω	470Ω	1 Meg.	470Ω	13KΩ	0Ω	30KΩ	-
2	6K8	0Ω	0Ω	32KΩ	50KΩ	47KΩ	0Ω	.1Ω	24OΩ	1.4Ω
3	6J5	3Ω	0Ω	80KΩ	80KΩ	47KΩ	INF.	.1Ω	0Ω	-
4	6K7	0Ω	0Ω	32KΩ	13KΩ	1.5KΩ	0Ω	.1Ω	1.5KΩ	52OKΩ
5	6SK7	0Ω	0Ω	1KΩ	1 Meg.	1KΩ	13KΩ	.1Ω	31KΩ	-
6	6SL7GT	3KΩ	30KΩ	30KΩ	47KΩ	0Ω	100KΩ	.1Ω	0Ω	-
7	6SJ7	0Ω	0Ω	0Ω	47KΩ	2Ω	85KΩ	.1Ω	110KΩ	-
8	6V6GT	0Ω	0Ω	15KΩ	0Ω	1.2 Meg.	15KΩ	.1Ω	2.7KΩ	-
9	6SN7GT	800KΩ	80KΩ	1KΩ	470KΩ	80KΩ	1KΩ	.1Ω	0Ω	-
10	6V6GT	3Ω	0Ω	30KΩ	30KΩ	480KΩ	INF.	.1Ω	2.9KΩ	-
1	6V6GT	0Ω	0Ω	30KΩ	30KΩ	480KΩ	250KΩ	.1Ω	2.9KΩ	-
2	5Y3GT	INF.	30KΩ	INF.	3KΩ	INF.	3KΩ	INF.	30KΩ	-

LIMITER CONTROL ON FULL, RF GAIN ON FULL, B+ ON, AF GAIN ON FULL, SELECTIVITY AT #5, TONE CONTROL AT LOW.
TUBES 10, 11 & 12, VOLTAGE AND RESISTANCE READINGS TAKEN IN 10 METER BAND.
*AVC-MVC-CWO SWITCH IN CWO POSITION.
TUBES 1 through 9, VOLTAGE AND RESISTANCE READINGS TAKEN IN BAND E.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



DATE 5/48-#4811-16 · SET #41-FOLDER #16

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

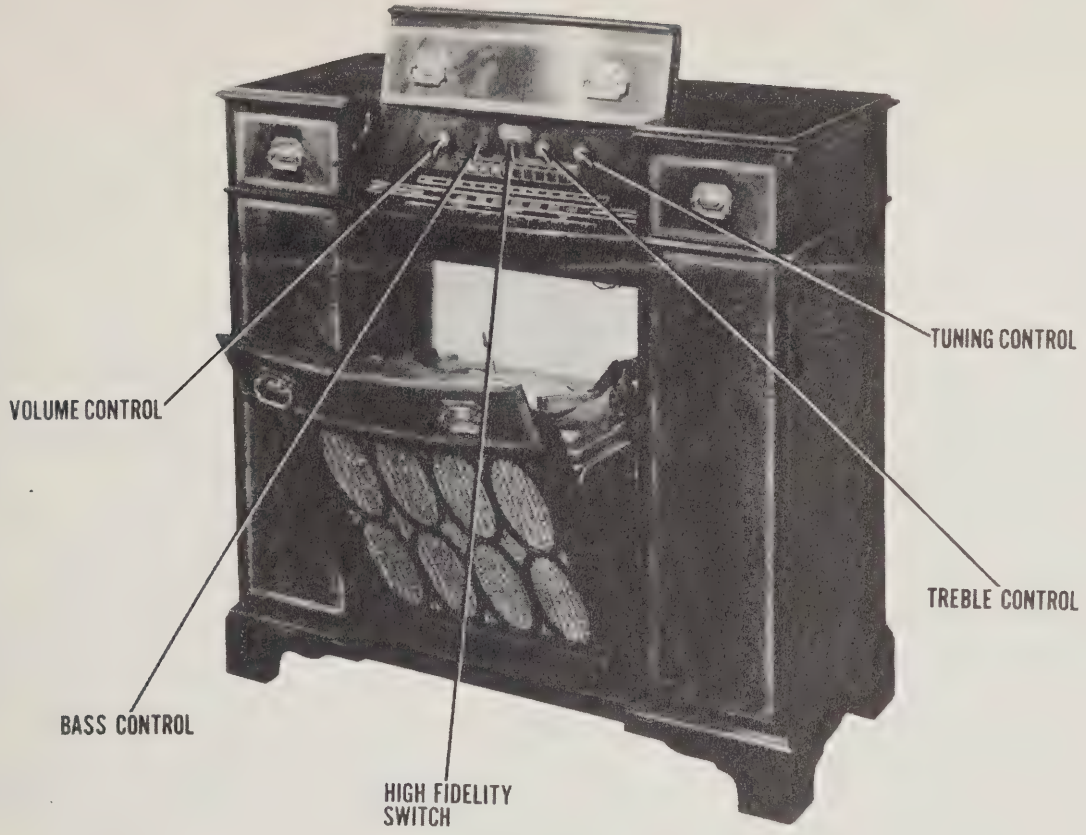
RMA Dummy consists of 200 MMFD cap. in series with 20 micronenry choke with choke shunted by 400 MMFD cap. in series with 400Ω carbon resistor.

Use 400 ∿ amp. modulated signal in all Steps of RF Alignment.

In Steps 4, 7, 10, 12, 14 and 16 it is necessary for correct alignment that the oscillator work above the incoming signal. To check this tune signal generator 910KC above the dial reading of receiver. If image signal is not heard, retune signal generator to original frequency and open oscillator trimmer to next peak. Adjust for maximum output and recheck for image.

RF Gain control and AF Gain control should be at maximum (setting at 10) and output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for all adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	Direct	High side to grid cap. 6K8. Low side to chassis.	Tune for maximum output between 453 & 457KC (unmodulated signal	F	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4, A5.	Limiter control should be set at "0", power supply switch to "B+ ON", control switch to "CWO", RF gain control to "10", AF gain Control to "10", selectivity control to "5", phasing control to "0", tone control to "N". Adjust CW osc. for beat note about 400 ∿. After sig. gen. is tuned to maximum output adjust A1, A2, A3, A4 & A5 for maximum output. Use minimum signal input in order to avoid overloading.
2	Direct	"	See Remarks.	"	"	"	A6	Set selectivity switch to "1". Detune signal gen. 3 or 4 KC. Adjust A6 for maximum output. Retune sig. gen. for maximum output. (Setting of Step 1).
3	Direct	"	"	"	"	"	A7	Set selectivity switch to "OFF". Tune for maximum output and adjust A7 for maximum output. Turn phasing control to 0, selectivity switch to "5" and tune sig. gen. for maximum output. Note meter reading. Turn selectivity switch to "OFF". Meter reading should decrease slightly. If an increase is noted Steps 1, 2 & 3 should be repeated as this is an indication of improper IF adjustment.
4	RMA Dummy	High side to ext. ant. post. Low side to chassis.	1.0MC (400Ω Amp. mod.)	"	1.0MC	"	A8	Set control switch "MVC" selectivity switch to to "OFF". Adjust A8 for maximum output. Check for image per prealignment instructions.
5	"	"	"	"	Tune for maximum output.	"	A9,A10	Adjust for maximum output.
6	"	"	500KC	"	500KC	"	A11	Adjust for maximum output. Repeat Steps 4, 5 & 6 until no further improvement can be made.
7	"	"	2.0MC	E	2.0MC	"	A12	Adjust for maximum output. Check for image per prealignment instructions.
8	"	"	"	"	Tune for maximum output.	"	A13,A14	Adjust for maximum output.
9	"	"	1.0MC	"	1.0MC	"	A15	Adjust for maximum output. Repeat Steps 7, 8 & 9 until no further improvement can be made.
10	"	"	4.0MC	D	4.0MC	"	A16	Adjust for maximum output. Check for image per prealignment instructions.
11	"	"	"	"	Tune for maximum output.	"	A17,A18	Adjust for maximum output.
12	"	"	7.2MC	C	7.2MC	"	A19	Adjust for maximum output. Check for image per prealignment notes.
13	"	"	"	"	Tune for maximum output.	"	A20,A21	Rock tuning cap. and adjust for maximum output.
14	"	"	14.0MC	B	14.0MC	"	A22	Adjust for maximum output. Check for image per prealignment notes.
15	"	"	"	"	Tune for maximum output.	"	A23, A24	Rock tuning cap. and adjust for maximum output.
16	"	"	30.0MC	A	30.0MC	"	A25	Adjust for maximum output. Check for image per prealignment notes.
17	"	"	"	"	Tune for maximum output.	"	A26, A27	Rock tuning cap. and adjust for maximum output.
18	"	"	30.0MC	"10" Meter Bandspread	30.0MC	"	A28	Adjust for maximum output. Check for image per prealignment notes.
19	"	"	"	"	Tune for maximum output.	"	A29, A30	Rock tuning cap. and adjust for maximum output.
20	"	"	27.0MC	"	27.0MC	"	A31	Adjust for maximum. Repeat Steps 18, 19 & 20 until no further improvement can be made.
21	"	"	14.4MC	"20" Meter Bandspread	14.4MC	"	A32	Adjust for maximum output. Check for image per prealignment notes.
22	"	"	14.4MC	"	Tune for maximum output.	"	A33, A34	Rock tuning cap. and adjust for maximum output.
23	"	"	14.0MC	"	14.0MC	"	A35	Adjust for maximum output. Repeat Steps 21, 22 & 23 until no further improvement can be made.
24	"	"	7.3MC	"40" meter bandspread	7.3MC	"	A36	Adjust for maximum output. Check for image per prealignment notes.
25	"	"	7.3MC	"	Tune for maximum output.	"	A37, A38	Rock tuning cap. and adjust for maximum output.
26	"	"	7.0MC	"	7.0MC	"	A39	Adjust for maximum output. Repeat Steps 24, 25 & 26 until no further improvement can be made.
27	"	"	4.0MC	"80" meter bandspread	4.0MC	"	A40	Adjust for maximum output. Check for image per prealignment.notes.
28	"	"	"	"	Tune for maximum output.	"	A41, A42	Rock tuning cap. and adjust for maximum output.
29	"	"	3.5MC	"	3.5MC	"	A43	Adjust for maximum output. Repeat Steps 27, 28 & 29 until no further improvement can be made.



PHILCO MODELS
48-1274, 48-1276

PHILCO MODELS
48-1274, 48-1276

PHILCO MODEL 48-1276

TRADE NAME	Philco, Model 48-1274, 48-1276
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio 2 Band AM-FM Superheterodyne Receiver
TUBES (SIXTEEN)	Types, 6AU6 RF Amp., 7F8 Osc.-Doubler, 7E5 Mixer, 7H6 1st IF Amp., 7B7 2nd IF Amp., 7H7 3rd IF Amp., 7E6 AM Det.-AVC-AF, FM1000 FM Det., 6J5GT Phono Pre-Amp., 7F7 Control Amp., 7E7 Rect. Reactor, 6J5GT Driver, 6J5GT Phase Inv., (2) 6L6GA Power Output, 5U4G Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	1.48 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1720KC SHORT WAVE 9.25-15.5MC FREQ. MOD. 88-108MC

PUSHBUTTON ADJUSTMENTS

1. Turn set on and allow to warm up for at least fifteen minutes.
2. Rotate tuning control until Allen-head set screw at end of cam shaft is accessible from the rear of chassis.
3. Loosen set screw four turns and remove wrench.
4. Make a list of the desired BC or FM stations in order, and place the call-letter tabs of these stations in the selector buttons in the same order.
5. Remove selector button and place extension spring so that it will engage the correct rocker bar (up for BC, down for FM).
6. Depress BC or FM button for station to be set up, and manually tune in station. Hold tuning control stationary and depress selector button to be set up.
7. After tuning motor stops, operate set-up switch (240) and hold until motor stalls, then release. This station is now set up.
8. Set the remaining buttons in same manner.
9. Rotate tuning control until Allen-head set screw is again accessible, tighten set screw and remove wrench.

HOWARD W. SAMS & CO., INC. • 2924 East Washington Street • Indianapolis 7, Indiana

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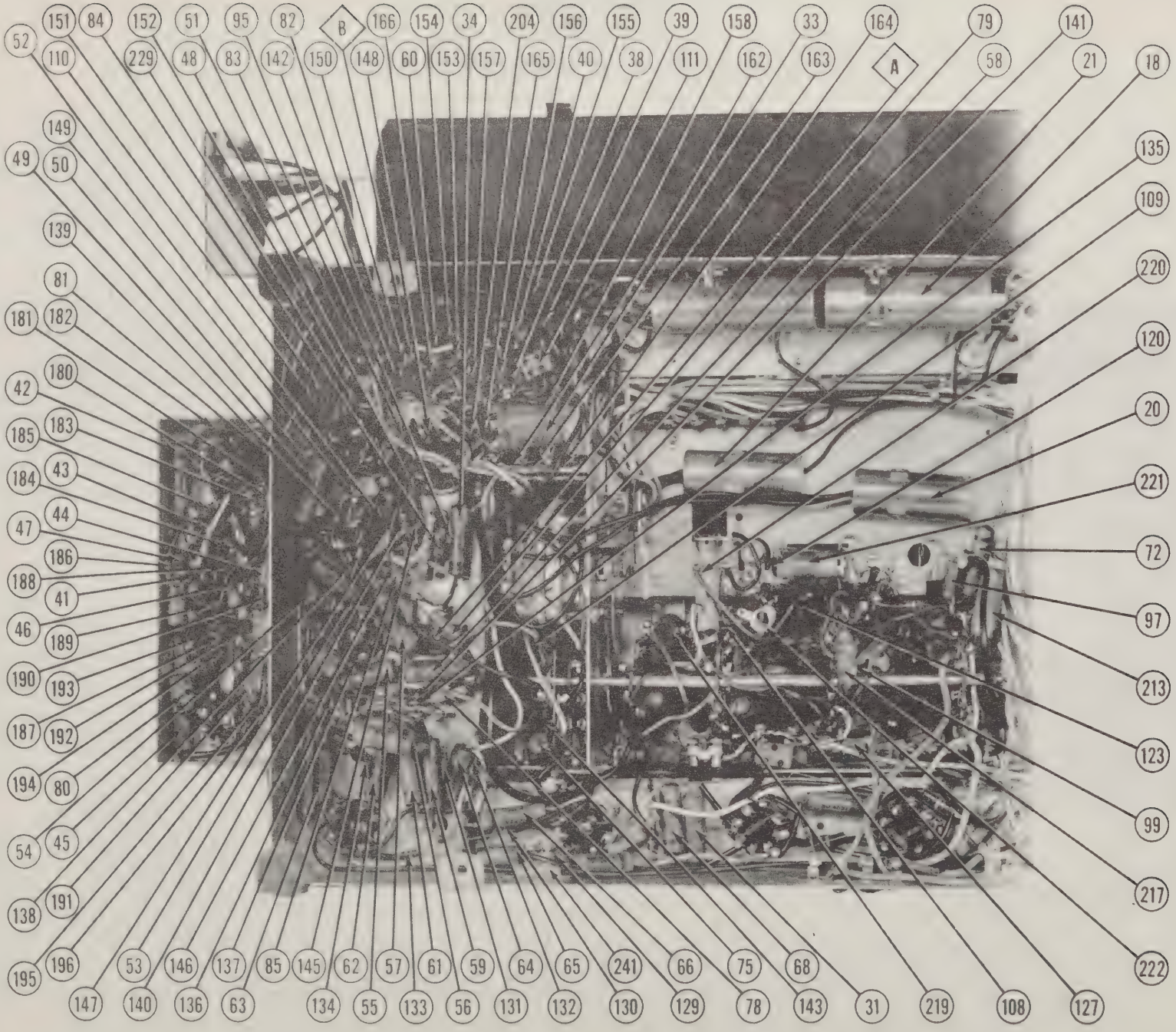
DATE 5/48-#4811-17 SET #41-FOLDER #17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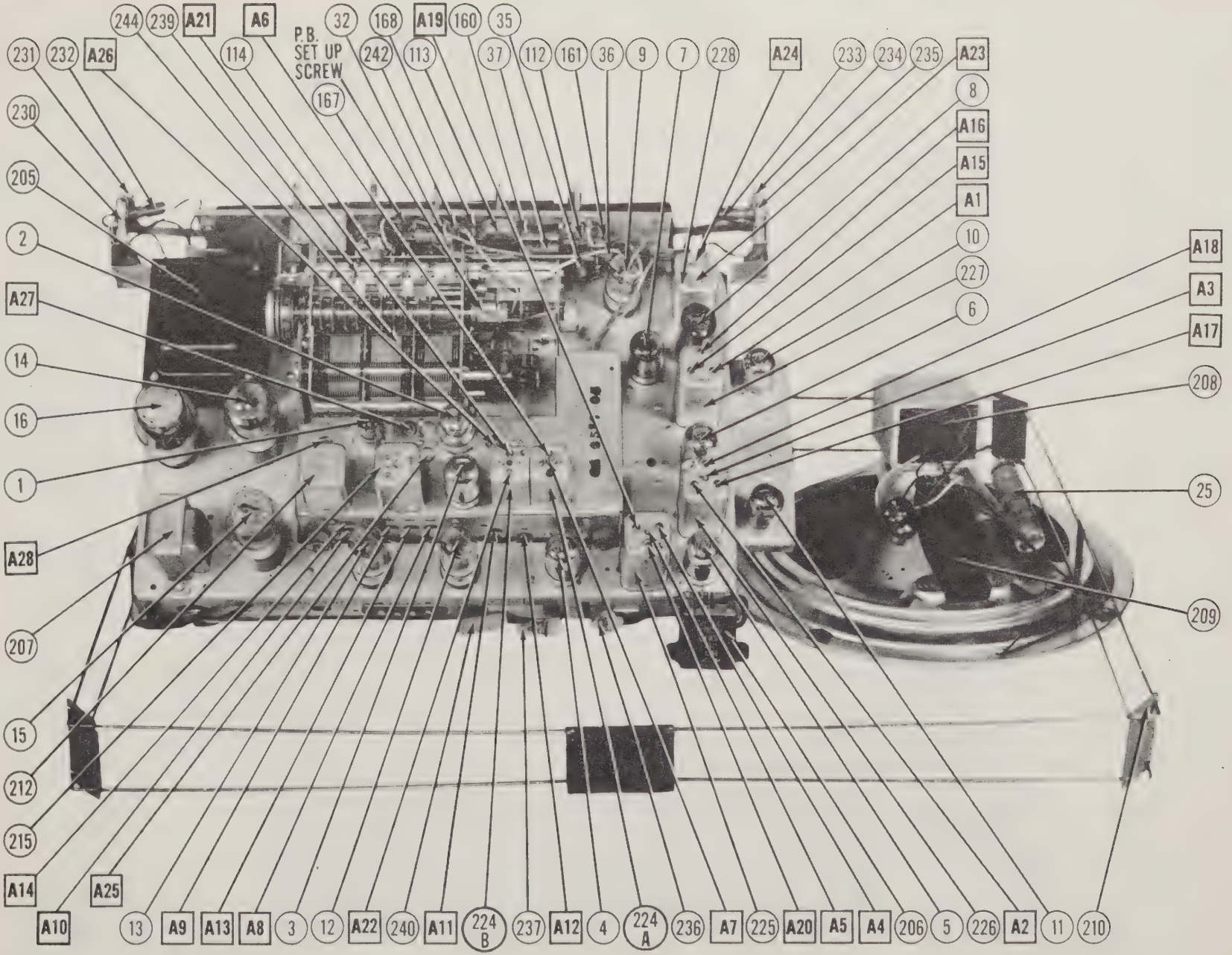
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P.B. SET UP SCREW
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6AU6	6AU6	7BK	
2	Osc. & Doubler	7F8	7F8	8BW	
3	Mixer	7E5	7E5	8BN	
4	1st IF Amp.	7H7	7H7	8V	
5	2nd IF Amp.	7B7	7B7	8V	
6	3rd IF Amp.	7H7	7H7	8V	
7	AM Det.-AVC-AF	7E6	7E6	8W	
8	FM Det.	FM1000	FM1000		
9	Phono Pre-Amp.	6J5GT	6J5GT	6Q	
10	Control Amp.	7F7	7F7	8AC	
11	Rect. Reactor	7E7	7E7	8AE	
12	Driver	6J5GT	6J5GT	6Q	
13	Phase Inv.	6J5GT	6J5GT	6Q	
14	Power Output	6L6GA	6L6GA	7AC	
15	" "	6L6GA	6L6GA	7AC	
16	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
17	40	450	30-2568-20	AF8J	UP4045	DY-40-450	EL-4	Filter
18A	30	450	30-2570-3	AF44J	UP2245	DY-2x20-450	EL-220	■ "
B	10	450						▲ "
19A	15	450	30-2570-6	AF222J	UP15D145	DY-3x15-450	EL-344	■ Decoupling
B	10	450						▲ Filter
C	10	450						AF Decoupling
20	30	30VAC	30-2572					Motor Starting Cap.-Note 1
21	30	30VAC	30-2572					" " †" "
22	.2	200	45-3500-3	484-.2	DT4P2	ST-4-2	TC-2	Bias Filter
23	.2	200	45-3500-3	484-.2	DT4P2	ST-4-2	TC-2	" "
24	.2	200	45-3500-3	484-.2	DT4P2	ST-4-2	TC-2	" "
25	2	200	45-3030					Speaker Coupling
26	.01	1000	61-0120	684-01	DT6S1	ST-6-01	TC-11	Output Plate Bypass
27	.01	1000	61-0120	684-01	DT6S1	ST-6-01	TC-11	" " "
28	.006	400	61-0105	484-006	DT4D6	ST-6-006	TC-26	Audio Coupling
29	.006	400	61-0105	484-006	DT4D6	ST-6-006	TC-26	" "
30	.006	400	61-0105	484-006	DT4D6	ST-6-006	TC-26	" "
31	.006	400	61-0105	484-006	DT4D6	ST-6-006	TC-26	" " -See Note 2
32	.03	400	45-3500-1	484-03	DT4S3	ST-4-03	TC-13	Tone Compensation
33	.5	120	61-0133	484-.5	DT4P5	ST-4-5	TC-5	Bias Filter
34	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
35	.03	400	45-3500-1	484-03	DT4S3	ST-4-03	TC-13	" "
36	.02	200	61-0108	484-02	DT4S2	ST-4-02	TC-12	Tone Compensation
37	.02	200	61-0108	484-02	DT4S2	ST-4-02	TC-12	" "
38	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
39	.1	200	61-0113	484-.1	DT4P1	ST-4-.1	TC-1	Cathode Bypass
40	.001	400	45-3500-5	484-001	DT4D1	ST-6-001	TC-21	Phono Tone Comp.
41	.002	600	61-0062	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
42	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Bias Filter
43	.02	400	61-0108	484-02	DT4S2	ST-4-02	TC-12	" "
44	.03	400	45-3500-1	484-03	DT4S3	ST-4-03	TC-13	" "
45	.001	600	45-3500-5	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
46	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Diode Filter
47	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	" "
48	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Screen Bypass
49	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Fil. Bypass
50	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	" "
51	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass Power Supply

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
52	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Bias Filter
53	.0004	600	61-0179	684-004	DT6D4	ST-6-004	TC-24	3rd IF Decoupling
54	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	3rd IF Screen Bypass
55	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	3rd IF Cathode
56	.05	200	61-0122	484-05	DT4S5	ST-4-05	TC-15	3rd IF Grid Filter
57	.006	400	61-0105	484-006	DT4D6	ST-6-006	TC-26	Audio Coupling
58	.003	600	61-0109	684-003	DT6D3	ST-6-003	TC-23	" "
59	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass Pwr. Supply
60	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass
61	.004	600	61-0179	684-004	DT6D4	ST-6-004	TC-24	2nd IF Decoupling
62	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	2nd IF Screen Bypass
63	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Fil. Bypass
64	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
65	.004	600	61-0179	684-004	DT6D4	ST-6-004	TC-24	1st IF Decoupling
66	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	1st IF Screen Bypass
67	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Fil. Bypass
68	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
69	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Mixer Cathode Bypass
70	.05	600	61-0122	684-05	DT6S5	ST-6-05	TC-15	Mixer Plate Decoup.
71	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Decoupling
72	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Decoupling
73	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Fil. Bypass
74	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
75	.003	600	61-0109	684-003	DT6D3	ST-6-003	TC-23	Audio Coupling
76	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass
77A	.01	600	61-0120	684-01	DT6S1	MPH-6-01	TC-11	Line Filter
B	.01	600	61-0120	684-01	DT6S1	MPH-6-01	TC-11	" "
78	47	500	60-00515307	1468-00005	5W5Q5	MO.5-45	1FM-45	Tone Compensation
79	33	500	60-00365307	1468-00004	5W5Q3	MO.5-43	MS-43	" "
80	330	500	60-10335407	1468-00035	5W5T3	MO.5-33	1FM-335	Audio Coupling
81	330	500	60-10335407					Phase Shift Cap.
82	1500	300	60-20155404	1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass-Cer.
83	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling
84	220	500	60-10245307	1468-0002	5W5T2	MO.5-32	1FM-32	Diode Filter
85	100	300	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	" " -Cer.
86	220	500	60-10245307	1468-0002	5W5T2	MO.5-32	1FM-32	IF Coupling
87	100	300	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
88	1000	300	30-1225	1468-001	1W5D1	MO.5-21	1FM-21	" " "
89	255	500	30-1220-24					Fixed Pad-Silver
90	36	300	30-1224					Fixed Trimmer-Cer.
91	100	300	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
92	5	500	60-90505007	1468-000005	5W5V5	MO.5-55	MS-55	Osc. Coupling
93	215	500	30-1220-4					Fixed Pad-Silver
94	510	500	60-10515307					" " "
95	220	500	60-10245307	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass
96	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Note 3
97	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Decoupling
98	1500	300	30-1225-1	1467-0015	1W5D15	MW.5-215	1FM-215	RF Screen Bypass-Cer.
99	240	300	60-10245307	1468-00025	5W5T25	MO.5-325	1FM-325	Fil. Bypass-Cer.
100	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Cathode Bypass
101	100	300	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
102	22	500	60-02200001	1468-000025	5W5Q2	MO.5-425	MS-425	" " -Silver
103	255	500	30-1220-24					Fixed Pad - Silver
104	5	300	60-90505007	1469-000005	5R5V5	MOS.5-55	MS-55	Fixed Trimmer-Cer.
105	51	300	30-1224-2	1468-00005	5W5Q5	MO.5-45	MS-45	Osc. Feedback-Cer.
106	51	300	30-1224-2	1468-00005	5W5Q5	MO.5-45	MS-45	Osc. Grid Cap.-Cer.
107	24	300	30-1224-4	1468-000025	5W5Q25	MO.5-425	MS-425	Osc. Coupling-Cer.
108	24	300	30-1224-4	1468-000025	5W5Q25	MO.5-425	MS-425	" " "
109	100	300	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass-Cer.
110	33	500	60-00365307	1468-00004	5W5Q3	MO.5-43	1FM-43	Det. Grid Cap.
111	150	500	60-10155407	1468-00015	5W5T15	MO.5-315	1FM-315	Audio Coupling
245	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass

Note 1-This is a non-polarized electrolytic for AC use.
Note 2-Some models use .003 in this application. Replacements same as Item #58.
Note 3-Some models use 510MMF in this application.
†-Not used in all models.

DATE 5/48-#4911-17 SET #41-FOLDER #17

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
113A	500KΩ	½	33-5539-6			Volume Control tapped @ 50KΩ & 250KΩ
113	1 Meg.	½	33-5539-9			Bass Control
114A	500KΩ	½	33-5543			Treble Control } Dual
B	50Ω	1				Tweeter Control

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
115	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
116	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
117	82Ω	½	66-0823340		Gray-Red-Blk. RF Cathode
118	39KΩ	½	66-3393340	BTS-39K	Or.-White-Or. RF Screen Dropping
119	6800Ω	½	66-2683340	BTS-6800	Blue-Gray-Red Oscillator Plate Load
120	10Ω	½	66-0103340		Br.-Blk.-Br. Parasitic Suppressor
121	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Oscillator Grid
122	27KΩ	½	66-3273340	BTS-27K	Red-Vi.-Or. Doubler Plate Load
123	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Doubler Grid
124	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. Mixer Grid
125	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red Mixer Cathode
126	56KΩ	½	66-3563340	BTS-56K	Grn.-Blue-Or. Mixer Plate Decoupling
127	470Ω	1	66-1474340	BTA-470	Yl.-Vi.-Br. Decoupling
128	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. 1st IF Grid
129	180Ω	½	66-1183340		Br.-Gray-Br. 1st IF Cathode
130	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. 1st IF Screen Dropping
131	6800Ω	½	66-2683340	BTS-6800	Blue-Gray-Red 1st IF Plate Decoupling
132	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. AVC Network
133	180Ω	½	66-1183340		Br.-Gray-Br. 2nd IF Cathode
134	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. 2nd IF Screen Dropping
135	5600Ω	½	66-2563340	BTS-5600	Grn.-Blue-Red 2nd IF Plate Load
136	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. 3rd IF Grid-See Note
137	180Ω	½	66-1183340		Br.-Gray-Br. 3rd IF Cathode
138	82KΩ	½	66-3823340	BTS-82K	Gray-Red-Or. 3rd IF Screen Dropping
139	5600Ω	½	66-2563340	BTS-5600	Grn.-Blue-Red 3rd IF Plate Decoupling
140	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. AVC Network
141	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Tone Compensation
142	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. " "
143	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. " "
144	10Ω	½	66-0103340		Br.-Blk.-Blk. Parasitic Suppressor
145	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
146	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Diode Load
147	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
148	47KΩ	1	66-3474340	BTA-47K	Yl.-Vi.-Or. Detector Bias Network
149	560Ω	½	66-1563340	BTS-560	Grn.-Blue-Br. " " "
150	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Detector Plate Load
151	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. FM Detector Grid
152	56KΩ	½	66-3563340	BTS-56K	Grn.-Blue-Or. FM Detector Screen Dropping
153	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Phono Tone Compensation
154	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. Phono Amp. Grid
155	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Phono Amp. Cathode
156	56KΩ	1	66-3564340	BTA-56K	Grn.-Blue-Or. Phono Amp. Plate Load
157	22KΩ	1	66-3224340	BTA-22K	Red-Red-Or. Decoupling
158	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Tone Compensation
159	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. " "
160	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. " "
161	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. " "
162	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AF Grid
163	680KΩ	½	66-4683340	BTS-680K	Blue-Gray-Yl. Bias Network
164	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. Bias Network
165	56KΩ	1	66-3564340	BTA-56K	Grn.-Blue-Or. AF Plate Load
166	6800Ω	1	66-2684340	BTA-6800	Blue-Gray-Red Decoupling
167	10Ω	½	66-0103340	BW-½-10	Br.-Blk.-Blk. Tone Compensation
168	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. " "
169	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Driver Grid

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
207	4900Ω CT	6.4Ω tapped @ 3.7Ω	330Ω CT	.6Ω tapped @ .4Ω	32-6267	A-30830‡	T22860‡	A-2935‡	Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
208A	FIELD RES. 360Ω	VC IMP. 3.7Ω	Part of 36-1612			
209A	CONE DIA. 11¾"	VC DIA. 1"				
208M	FIELD PM	VC IMP. 3.5Ω	Part of 36-1612			
209M	CONE DIA. 4-5/8"	VC DIA. 1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
210	Loop Ant.		.1Ω	76-2344		
211	FM Ant.		0Ω	76-2029-12		
212	BC Ant.Coil		1.3Ω	61-0120		
213	SW Ant. Shunt Coil		.1Ω	32-4050-5		
214	FM-Ant. "		0Ω	32-4235		
215A	BC-RF "		3.5Ω			
B	SW-RF "		.1Ω	32-4187		
216	FM-RF "		0Ω	30-4067		
217	AM-Plate Choke		33Ω	32-4189		
218	FM-Plate Choke		.3Ω	32-4061		
219	BC Osc.Coil		3.5Ω	32-4188		
220	SW Osc.Coil		.1Ω	32-4069		
221	FM Osc.Coil	.3Ω	.1Ω	32-4070		
222	Freq. Doub. Coil		.4Ω	32-4071		
223	Osc. Doub. Plate Coil		.4Ω	32-4061		
224A	AM 1st IF	1Ω	6Ω	32-4072		
B	FM " "	.5Ω	.6Ω			
225A	AM 2nd IF	8.5Ω*		32-4060		*Includes both primaries
B	FM " "					
226A	AM 3rd IF	8.5Ω*		32-4060		
B	FM " "					
227A	AM 4th IF	5Ω*	9Ω	32-4003-1		
B	FM " "		.1Ω			
228	FM Det. Trans.	.5Ω	1Ω	32-4004		
229	RF Choke		7.2Ω	32-3352		

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
170	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red Driver Cathode
171	56KΩ	1	66-3564340	BTA-56K	Grn.-Blue-Or. Driver Plate Load
172	1000Ω	½	66-2103340	BTS-1000	Br.-Blk.-Red Phase Inverter Cathode
173	68KΩ	½	66-3683340	BTS-68K	Blue-Gray-Or. Phase Inverter Grid
174	56KΩ	1	66-3564340	BTA-56K	Grn.-Blue-Or. Phase Inverter Plate Load
175	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Audio Coupling
176	820Ω	½	66-1823340	BTS-820	Gray-Red-Br. Parasitic Suppressor
177	820Ω	½	66-1823340	BTS-820	Gray-Red-Br. " "
178	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. Output Grid
179	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. " "
180	680KΩ	½	66-4683340	BTS-680K	Blue-Gray-Yl. Tone Compensation
181	330KΩ	½	66-4333340	BTS-330K	Or.-Or.-Yl. 1st Supp. Amp. Grid
182	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red 1st Supp. Amp. Cathode
183	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. 1st Supp. Amp. Plate Load
184	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. 2nd Supp. Amp. Plate Load
185	560KΩ	½	66-4563340	BTS-560K	Grn.-Blue-Yl. 2nd Supp. Amp. Grid
186	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Bias Network
187	560KΩ	½	66-4563340	BTS-560K	Grn.-Blue-Yl. " "
188	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Bias Network
189	1.5 Meg.	½	66-5153340	BTS-1.5 Meg.	Br.-Grn.-Grn. " "
190	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. " "
191	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Reactance Grid
192	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. Bias Network
193	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. " "
194	27KΩ	2		BT-2-27K	Red-Vi.-Or. Reactance Plate Load
195	33KΩ	1	66-3334340	BTA-33K	Or.-Or.-Or. Reactance Screen Dropping
196	33KΩ	1	66-3334340	BTA-33K	Or.-Or.-Or. Reactance Screen Bleeder
197	5600Ω	½	66-2563340	BTS-5600	Grn.-Blue-Red Feedback
198	10Ω	1	66-0104340	BW-1-10	Br.-Blk.-Blk. Series Pilot Light
199	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Bias Voltage Divider
200	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. " " "
201	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Bias Filter
202	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Bleeder
203	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. "
204	5600Ω	1	66-2564340	BTA-5600	Grn.-Blue-Red Decoupling

Note-Some models use 1 Meg. in this application. Replacement same as #147.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
205	117V AC @ 1.48A	680V CT @ .180A	5.0V AC @ 3.0A	6.3V CT @ 1.5A	32-8286			
			SEC. 4	SEC. 5				
			6.4V AC @ 5.8A	26V AC @ 2.0A				

TRANSFORMER MATCHING

ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TURNS RATIO PRI. to SEC.	DC RES. PRI.	DC RES. SEC.	PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
206	1 to 70	.3Ω	570Ω	32-8256				

PARTS LIST AND DESCRIPTIONS (Continued)

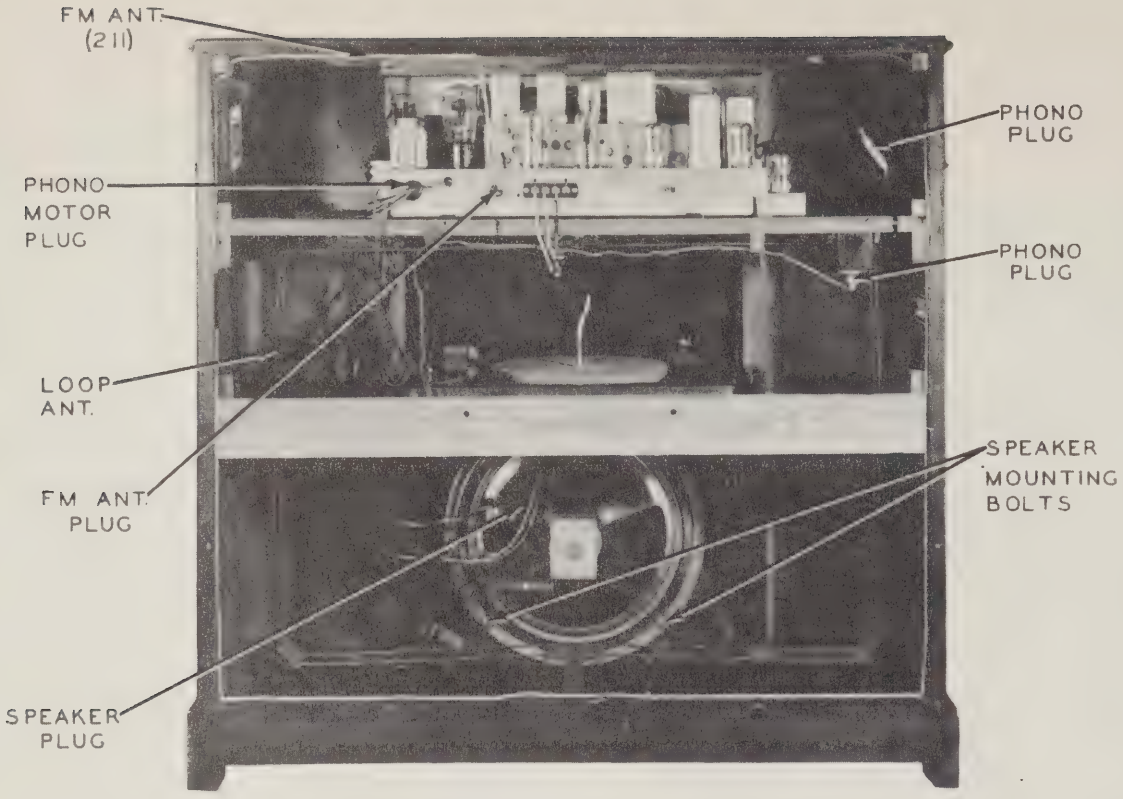
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PHILCO PART No.		INSTALLATION NOTES
230-234							
235	Bayonet	6-8	0.25	Blue	34-2064		Type 44
236	Bayonet	7.5	0.2	White	34-2040		Type 51
237	"	6-8	0.25	Blue	34-2064		Type 44

MISCELLANEOUS

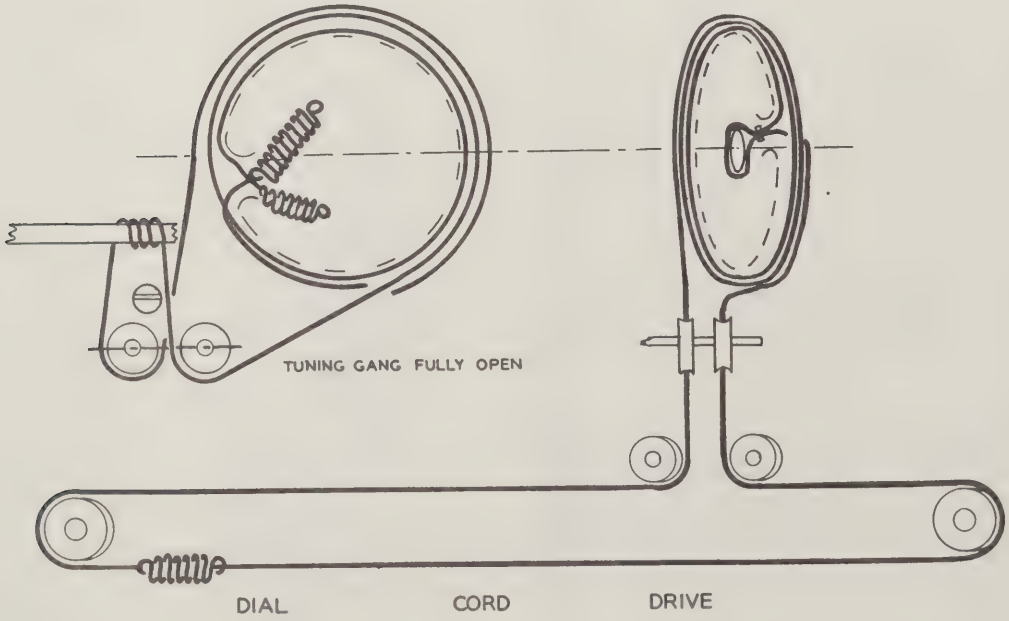
ITEM No.	PART NAME	PHILCO PART No.	NOTES
238	Switch	76-2150	Band-Phono
239	"	76-2150	PB
240	"	76-2140-2	Bin Light
241	"	42-1702	Set-up
242	"	42-1785	High Fidelity
243	"		Phono Power
244	3 Gang Var. Cap.	76-2150	AM (18-477MMF) each section
A8	Trimmer Strip	31-6477-1	SW Osc. Adj.
A9			SW RF Adj.
A13			BC RF Adj.
A10	Trimmer Strip	31-6476-3	SW Ant. Adj.
A14			BC Ant. Adj.
A11	Trimmer	31-6480-1	BC Osc. Adj.
A12	Padder	31-6473-4	" " "
A25	Trimmer	31-6480	FM Osc. Adj.
A26	"	31-6473-4	FM Osc. Doubler Adj.
A27	"	31-6473-4	FM RF Adj.
A28	"	31-6473-4	FM Ant. Adj.
	Motor	35-1324	Band Switching
	"	76-2428	PB Tuning
	Dial Pointer	76-2327	
	Dial Scale	76-3202	(48-1274) Mahogany
	" "	76-3202-1	(48-1274) Walnut
	" "	76-3020-2	(48-1276)

DATE 5/46-#4811-17 SET #41-FOLDER #17



DISASSEMBLY INSTRUCTIONS

1. Remove five push-on type control knobs.
2. Remove loop leads from terminal strip on rear of chassis.
3. Remove phono-pickup plug from phono matching transformer.
4. Remove one Phillips head screw holding loop antenna in cabinet. Remove loop from cabinet.
5. Remove phono-motor plug from chassis.
6. Remove speaker plug from speaker.
7. Disconnect phono matching transformer plug.
8. Remove phono-compartment light from bracket in comp. Remove pilot light from lower front of cabinet.
9. Remove four hex head screws holding chassis in cabinet. Remove two Phillips head wood screws from front chassis plate. Remove chassis from cabinet.
10. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
	1	6AU6	0V.	0V.	6.4VAC	0V.	280VDC	160VDC	1VDC	-
	2A	7F8	-	6.4VAC	-	-	0V.	260VDC	0V.	-9VDC§
‡	2B	7F8	-4VDC§	6.4VAC	200VDC	0V.	-	-	0V.	-3.5VDC§
	3	7E5	-11VDC	0V.	130VDC	2.8VDC	-11VDC	2.8VDC	130VDC	6.4VAC
	4	7H7	0V.	265VDC	105VDC	0V.	0V.	0V.	1.1VDC	6.4VAC
	5	7B7	6.4VAC	260VDC	90VDC	0V.	0V.	-.2VDC	1.6VDC	0V.
	6	7H7	6.4VAC	260VDC	110VDC	0V.	0V.	0V.	1.5VDC	0V.
	7	7E6	3.15VAC	125VDC	-.6VDC	0V.	-.4VDC	-.5VDC	0V.	3.15VAC
‡	8	FM1000	3.15VAC	-.2VDC	0V.	210VDC	55VDC	1.5VDC	0V.	3.15VAC
	9	6J5GT	0V.	3.15VAC	73VDC	0V.	0V.	0V.	3.15VAC	2.5VDC
**	10	7F7	6.4VAC	1.6VDC	149VDC	0V.	-10VDC	237VDC	0V.	0V.
**	11	7E7	6.4VAC	70VDC	-10VDC	-10VDC	110VDC	-8.5VDC	0V.	0V.
	12	6J5GT	0V.	3.15VAC	75VDC	0V.	0V.	125VDC	3.15VAC	2.3VDC
	13	6J5GT	0V.	3.15VAC	67VDC	0V.	0V.	225VDC	3.15VAC	2.5VDC
	14	6L6GA	0V.	0V.	290VDC	300VDC	-19VDC	-19VDC	6.4VAC	0V.
	15	6L6GA	0V.	0V.	290VDC	300VDC	-19VDC	-19VDC	6.4VAC	0V.
	16	5U4G	0V.	300VDC	0V.	340VAC	24.5VDC	340VAC	300VDC	300VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
	1	6AU6	6 Meg.	0Ω	.05Ω	0Ω	30KΩ	69KΩ	82Ω	-
	2A	7F8	-	.05Ω	-	-	.6Ω	57KΩ	0Ω	220KΩ
‡	2B	7F8	22KΩ	.05Ω	37KΩ	0Ω	-	-	0Ω	220KΩ
	3	7E5	2.2 Meg.	0Ω	86KΩ	1KΩ	2.2 Meg.	1KΩ	86KΩ	.05Ω
	4	7H7	0Ω	37KΩ	130KΩ	0Ω	0Ω	4 Meg.	180Ω	.05Ω
	5	7B7	.05Ω	36KΩ	130KΩ	0Ω	0Ω	1.4 Meg.	180Ω	0Ω
	6	7H7	.05Ω	36KΩ	110KΩ	0Ω	0Ω	28KΩ	180Ω	0Ω
	7	7E6	.05Ω	93KΩ	1.7 Meg.	0Ω	150KΩ	1.1 Meg.	0Ω	.05Ω
‡	8	FM1000	.05Ω	15KΩ	7.2Ω	80KΩ	90KΩ	560KΩ	0Ω	.05Ω
	9	6J5GT	0Ω	.05Ω	85KΩ	220KΩ	7KΩ	0Ω	.05Ω	2.2KΩ
**	10	7F7	.05Ω	2.2KΩ	250KΩ	330KΩ	1 Meg.	130KΩ	0Ω	0Ω
**	11	7E7	.05Ω	57KΩ	800KΩ	1.2 Meg.	30KΩ	2.4 Meg.	0Ω	0Ω
	12	6J5GT	0Ω	.05Ω	67KΩ	INF.	1 Meg.	93KΩ	.05Ω	1KΩ
	13	6J5GT	0Ω	.05Ω	67KΩ	1 Meg.	68KΩ	30KΩ	.05Ω	1KΩ
	14	6L6GA	0Ω	0Ω	30KΩ	30KΩ	440KΩ	440KΩ	.05Ω	0Ω
	15	6L6GA	0Ω	0Ω	30KΩ	30KΩ	440KΩ	440KΩ	.05Ω	0Ω
	16	5U4G	INF.	30KΩ	INF.	400Ω	100KΩ	400Ω	30KΩ	30KΩ

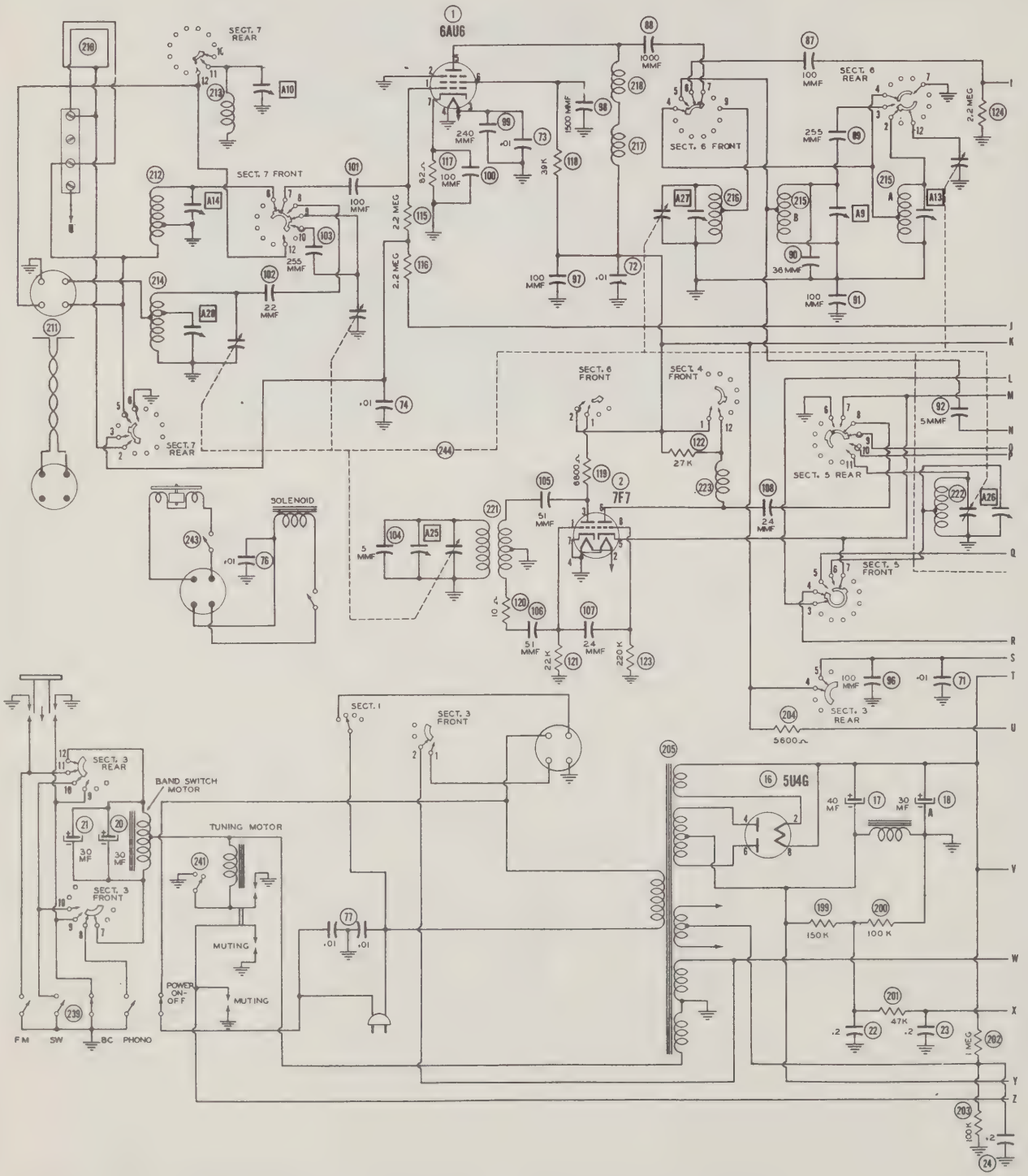
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RADIO-PHONO SWITCH IN PHONO POSITION.

FIDELITY SWITCH IN OFF POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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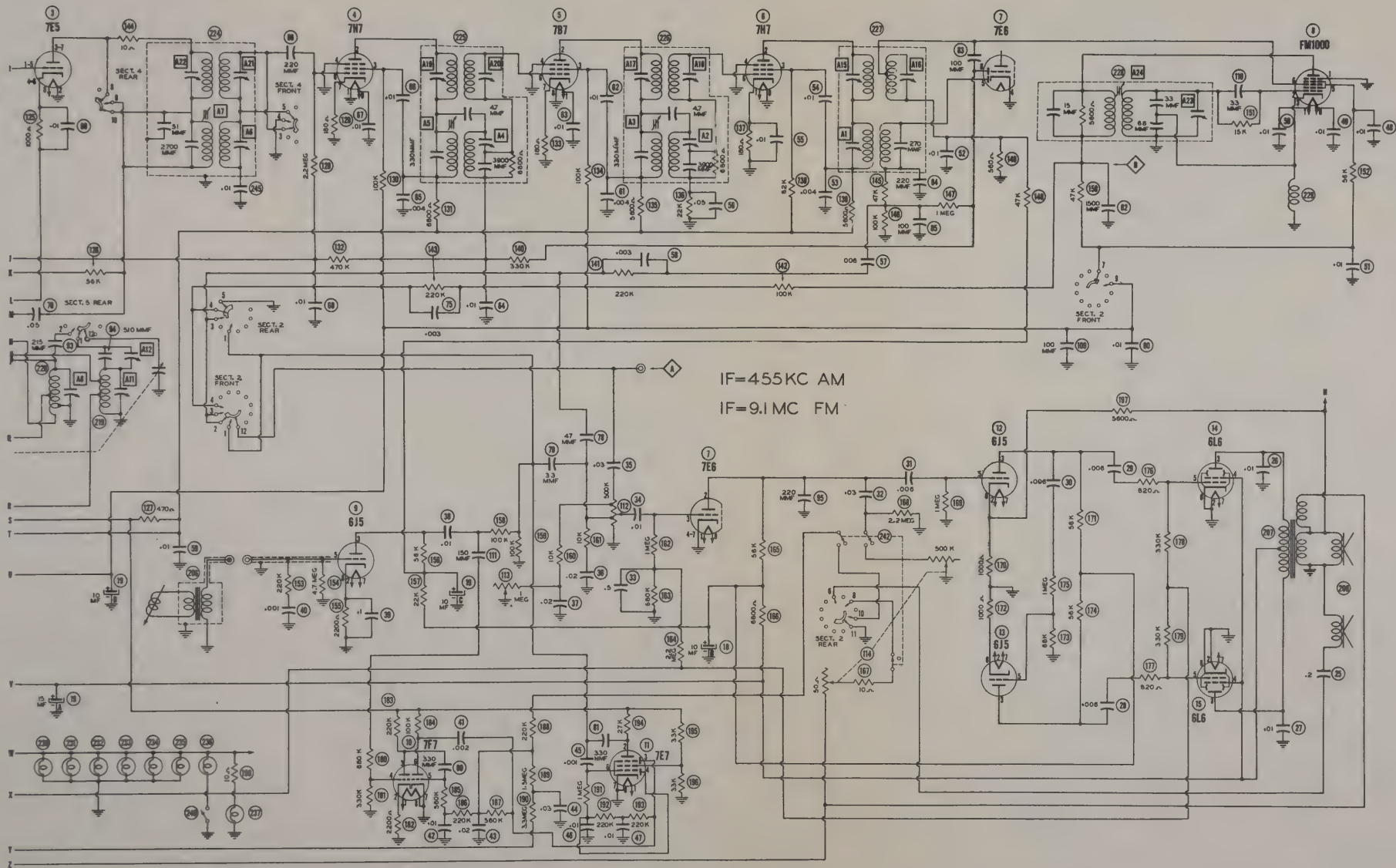

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If AM & FM Alignment are both to be done AM must be done first. If AM Alignment is not required chen FM Alignment may be done alone.

Attenuate signal generator output to maintain output meter reading of 1.5 volts.

Use insulated alignment screwdriver for all adjustments.

To set pointer turn tuning cap. fully closed and set pointer 3¼" from left edge of dial backplate. This is the calibration mark referred to in Steps below.

AM ALIGNMENT

Use 400∿ amplitude modulated signal.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to stator of right hand section of tuning cap. Low side to chassis.	455KC (amp. modulation)	BC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4, A5,A6, A7	Adjust in order given for maximum output. Do not repeat adjustments.
2		Loop	15MC	SW	8-1/16" from calibration mark.	"	A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Tune signal generator to 15.91MC. If image is not heard retune sig. gen. to 15MC and open A8 to next peak. Adjust for maximum output & recheck for image.
3		"	"	"	Tune for maximum output.	"	A9,A10	Rock tuning cap. and adjust for maximum output.
4		"	1720KC	BC	8-3/4" from calibration mark.	"	A11	Adjust for maximum output.
5		"	580KC	"	1-1/8" from calibration mark.	"	A12	" " " "
6		"	1500KC	"	Tune for maximum output.	"	A13, A14	Adjust for maximum output. Repeat Steps 4, 5 & 6 until no further improvement can be made.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ sweep and 450KC deviation.

Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7	.1 MFD.	High side to Pin 6 (grid) of 7B7 2nd IF Tube (5). Low side to chassis.	9.1MC (Freq. Mod.)	FM	Tuning cap. fully closed	Vertical input to Point Ⓐ. Ground to chassis.	A16,A15, A18,A17	Short pin 2 of FM1000 to chassis. Short Pin 4 (plate) of FM1000 to Point Ⓑ. Adjust A16,A15,A17,& A18 for max. amplitude, symmetry and coincidence of pattern per Fig. 4.
8	.1 MFD.	High side to Pin 6 (grid) of 7H7 1st IF Tube (4). Low side to chassis.	"	"	"	"	A20, A19	Adjust for maximum amplitude, symmetry & coincidence of pattern.
9	.1 MFD.	High side to Pin 5 (grid) of 7E5. Low side to chassis.	"	"	"	"	A21, A22	Adjust for maximum amplitude, symmetry & coincidence of pattern. Remove only the short from Pin 2 of FM1000.
10	.1 MFD.	"	Adjust sig. gen. for coincidence of pattern.	"	"	"	A23	Adjust for coincidence of two pips at peak of pattern per Fig. B. Remove short from Pin 4 of FM1000.
11	.1 MFD.	"	Leave at exact setting of previous Step.	"	"	"	A24	Adjust for crossover of pattern at horizontal sweep line per Fig. C. Continue with FM-RF Alignmment in Step 16.

FIG. A

FIG. B

FIG. C

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND OUTPUT METER

Use 400Ω amplitude modulated signal.

Loading network consists of 4700Ω resistor in series with .1 MFD cap. In Step 7 it will be necessary to force a piece of wire or solder down between ceramic form of A16 and edge of trimmer plate. Attach loading network to this wire and chassis.

In Steps 18 & 21 use a tuning wand to adjust FM coils. If output increases when brass end of wand is inserted in coil, expand coil slightly. If output increases upon insertion of iron end, compress coil slightly. Coil is properly adjusted when insertion of either end of wand causes a decrease in output.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7	.1 MFD.	High side to Pin 5 (grid) of 7E5. Low side to chassis.	9.1MC (Amp. Modulation)	FM	Tuning cap. fully closed	Across voice coil	A15	Short Pin 2 (grid) of FM 1000 to chassis. Connect loading network from high side of A16 to chassis. See pre-alignment notes. Adjust A15 for maximum output.
8	.1 MFD.	"	"	"	"	"	A16	Connect loading network from Pin 2 (plate) of 7H7 3rd IF Tube (6) to chassis. Adjust for maximum output.
9	.1 MFD.	"	"	"	"	"	A17	Connect loading network from Pin 6 (grid) of 7H7 3rd IF Tube (6) to chassis. Adjust A17 for maximum output.
10	.1 MFD.	"	"	"	"	"	A18	Connect loading network from Pin 2 (plate) of 7B7 2nd IF Tube (5) to chassis. Adjust A18 for maximum output.
11	.1 MFD.	"	"	"	"	"	A19	Connect loading network from Pin 6 (grid) of 7B7 2nd IF Tube (5) to chassis Adjust A19 for maximum output.
12	.1 MFD.	"	"	"	"	"	A20	Connect loading network from Pin 2 (plate) of 7H7 1st IF Tube (4) to chassis. Adjust A20 for maximum output.
13	.1 MFD.	"	"	"	"	"	A21, A22	Leave loading network as in Step 12. Adjust A21 & A22 for maximum output.
14	.1 MFD.	High side to Pin 6 (grid) of 7H7 3rd IF Tube (6). Low side to chassis.	9.1MC (Unmodulated)	"	"	"	A23	Remove loading network and short on FM1000. Connect jumper from Pin 4 (plate) of FM1000 to Point Ⓑ. Adjust A23 for zero beat. Remove jumper.
15	.1 MFD.	"	"	"	"	"	A24	Output of sig. gen. should be attenuated to just give usable signal. Adjust A24 for zero beat. Continue with FM-RF alignment in Step 16.

FM RF ALIGNMENT

Use 400∿ amplitude modulated signal.

In Steps 20 & 21 connect a dipole to Pins 1 & 2 of FM antenna socket. Connect a dipole to output of signal generator and space the two dipoles several feet apart. Each dipole may consist of two 30" lengths of wire.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
16	.1 MFD.	High side to Pin 2 of FM Antenna socket. Low side to chassis.	105MC (Amp. modulation)	FM	7-7/16" from calibration mark	Across voice coil	A25	Short Pin 2 (grid of FM 1000 to chassis. Adjust A25 for maximum output.
17	.1 MFD.	"	"	"	"	"	A26	Adjust A26 for maximum output. Remove short on Pin 2 of FM1000.
18	.1 MFD.	"	92MC	"	1-7/8" from calibration mark.	"	Freq. Doubler Coil (223).	Adjust per prealignment notes. Repeat Steps 16, 17 & 18 until no further improvement can be made.
19	.1 MFD.	"	105MC	"	Tune for maximum output.	"	A27	Rock tuning cap. and adjust for maximum output.
20	Dipole	See prealignment notes.	"	"	"	"	A28	Adjust for maximum output
21	Dipole	"	92MC	"	"	"	FM-RF Coil (217) FM-Ant. Coil (214)	Adjust per prealignment notes. Repeat Steps 19, 20 & 21 until no further improvement can be made.

STAGE GAIN MEASUREMENTS

ANTENNA TO RF GRID	3X		600KC
RF GRID TO CONVERTER GRID	2X		600KC
CONVERTER GAIN	5X	IN	600KC
		OUT	455KC
1st IF TRANSFORMER	1.5X		455KC
1st IF TUBE	65X		455KC
2nd IF TRANSFORMER	.1X		455KC
2nd IF TUBE	30X		455KC
3rd IF TRANSFORMER	.05X		455KC
3rd IF TUBE	3X		455KC
OUTPUT IF TRANSFORMER	7X		455KC
AF AMP.	10X		400∿
DRIVER	7X		400∿
OUTPUT	11X		400∿
PHONO AMP.	7X		400∿

DATE 5/48-#4811-17 SET #41-FOLDER #17

PHILCO MODEL 49-602
BATTERY-LINE OPERATED

PHILCO MODEL 49-602
BATTERY-LINE OPERATED

PHILCO MODEL 49-602

TRADE NAME	Philco, Model 49-602
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output
POWER SUPPLY RATING	105-120 Volts AC-DC or 7.5 Volts "A" Supply and 90 Volts "B" Supply in Pack Form .15 Amp. @ 117 Volts AC or 55MA @ 7.5 Volts DC and 12.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer 1" from left edge of dial backplate. This is the calibration mark referred to below.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to external ant. lead. Low side to B-. (Loop connected)	455KC	Tuning cap. fully closed.	Across voice coil	A1,A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF. to reduce hum modulation.
2		Loop	1600KC	4¼" from calibration mark.	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1500KC	Tune for maximum output.	"	A5	Rock tuning cap. and adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 49-602
BATTERY-LINE OPERATED

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1U5	1U5	6BW	
4	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	30	150	30-2568-21	AF886D4A	UP44315C	DY-401	EL-434	♠ Filter
B	20	150						■ "
C	30	150						▲ "
D	30	25						Filament Bypass
6	.047	400	61-0122	484-05	DT4S5	MPH-4-05	TC-15	Line Filter
7	.004	600	61-0179	684-004	DT6D4	ST-6-004	TC-24	Output Plate Bypass
8	.004	600	61-0179	684-004	DT6D4	ST-6-004	TC-24	Audio Coupling
9	.01	200	61-0120	484-01	DT2S1	ST-4-01	TC-11	" "
10	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AF Screen Bypass
11	.047	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
12	.1	200	61-0113	484-.1	DT2P1	ST-2-1	TC-1	Screen Bypass
13	.25	200	61-0125	484-.25	DT2P25	ST-2-25	TC-2	Grid Filter
14	.1	400	30-4527	484-.1	DT4P1	ST-4-1	72P2	Line Isolation
15	220	300	62-122001001	1468-00025	5W5T25	MO.5-325	1FM-325	Output Grid Bypass-Cer.
16	1.5	300	30-1221-3					Feedback-Cer.
17	1.5	300	30-1221-3					" "
18	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
19	5	300	30-1224-5	1468-000005	5W5V5	MO.5-55	MB-55	Ext. Ant. Coupling-Cer.

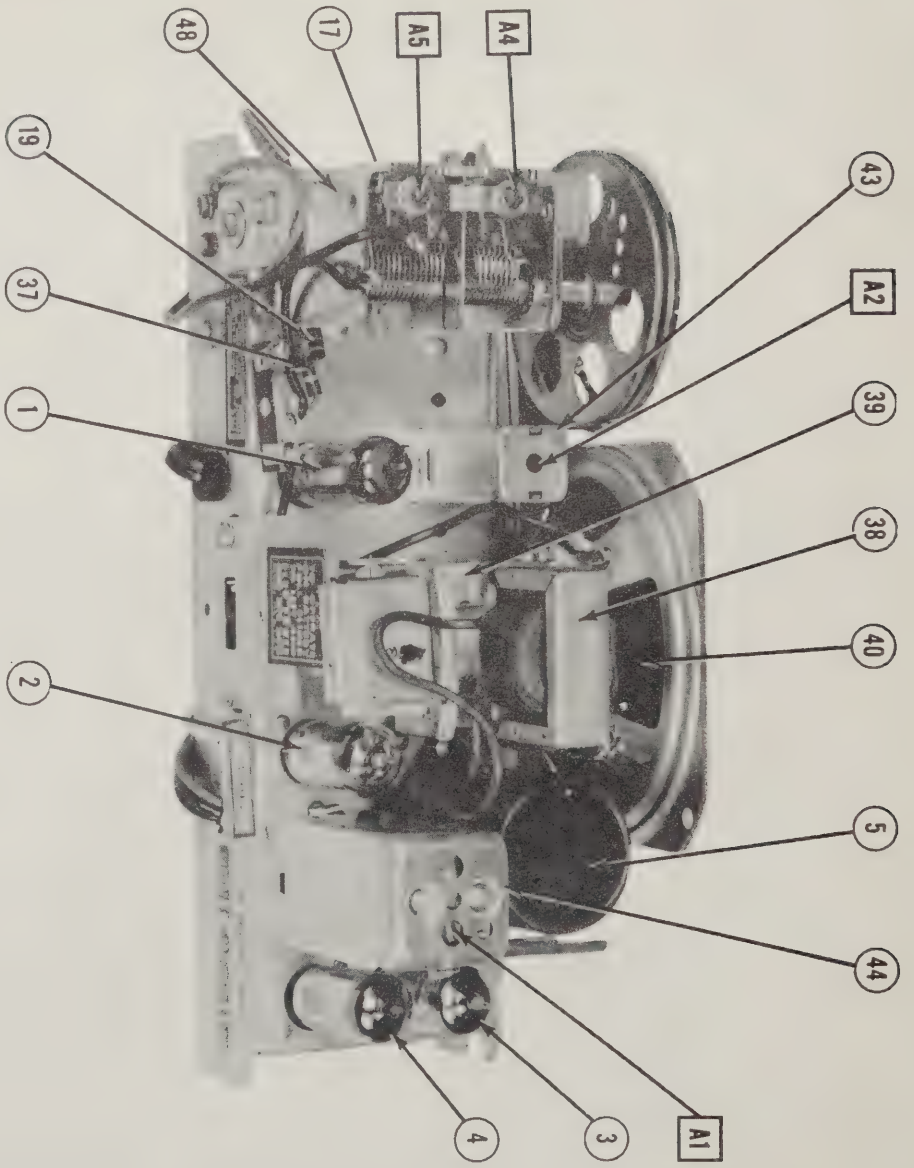
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20A	1 Meg.	½	33-5538-2B	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 20A per instructions
C	Switch		" "	42	SW-A2	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
21	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Conv. Grid
22	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Osc. Grid
23	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
24	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. " "
25	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. Screen Decoup.
26	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
27	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Screen
28	1.2 Meg.	½	66-5123340	BTS-1.2 Meg.	Br.-Red-Grn. AF Plate Load
29	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
30	270Ω	½	66-1273340	BW-½-270	Red-Vi.-Br. Fil. String
31	470Ω	½	66-5123340	BTS-470	Yl.-Vi.-Br. Fil. String
32	680Ω	½	66-1683340	BTS-680	Blue-Gray-Br. Fil. String
33	60Ω	1	33-1334	BW-1-60	Surge Limiter
34A	1125Ω	3	33-3431-5		Filament Dropping
B	1125Ω	3			" "
35	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Filter
36	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Line Isolation
37	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Ant. Loading

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
38	10KΩ	3.9Ω	675Ω	.6Ω	Part of 36-1627-1			A-2932#	#Bend mounting tabs down and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
39	FIELD	VC IMP.	36-1627-1	ST-113# Mod. P4-X	4A15	*Drill and tap magnet frame.
	PM	3.9Ω				
40	CONE DIA. 4"	VC DIA. 1/2"				

R F COILS

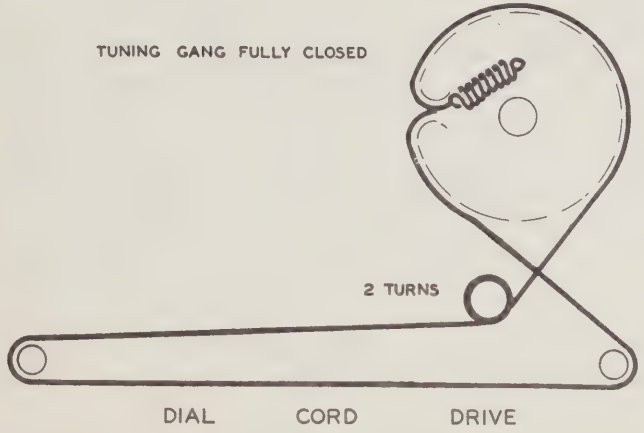
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.
41	Loop Ant.		3.3Ω	32-4274	
42	Osc. Coil	2.6Ω	6Ω	32-4282	14-1060
43	Input IF	12Ω	12Ω	32-4160-4	16-6668
44	Output IF	40Ω		32-3987-2	16-6670

BATTERIES

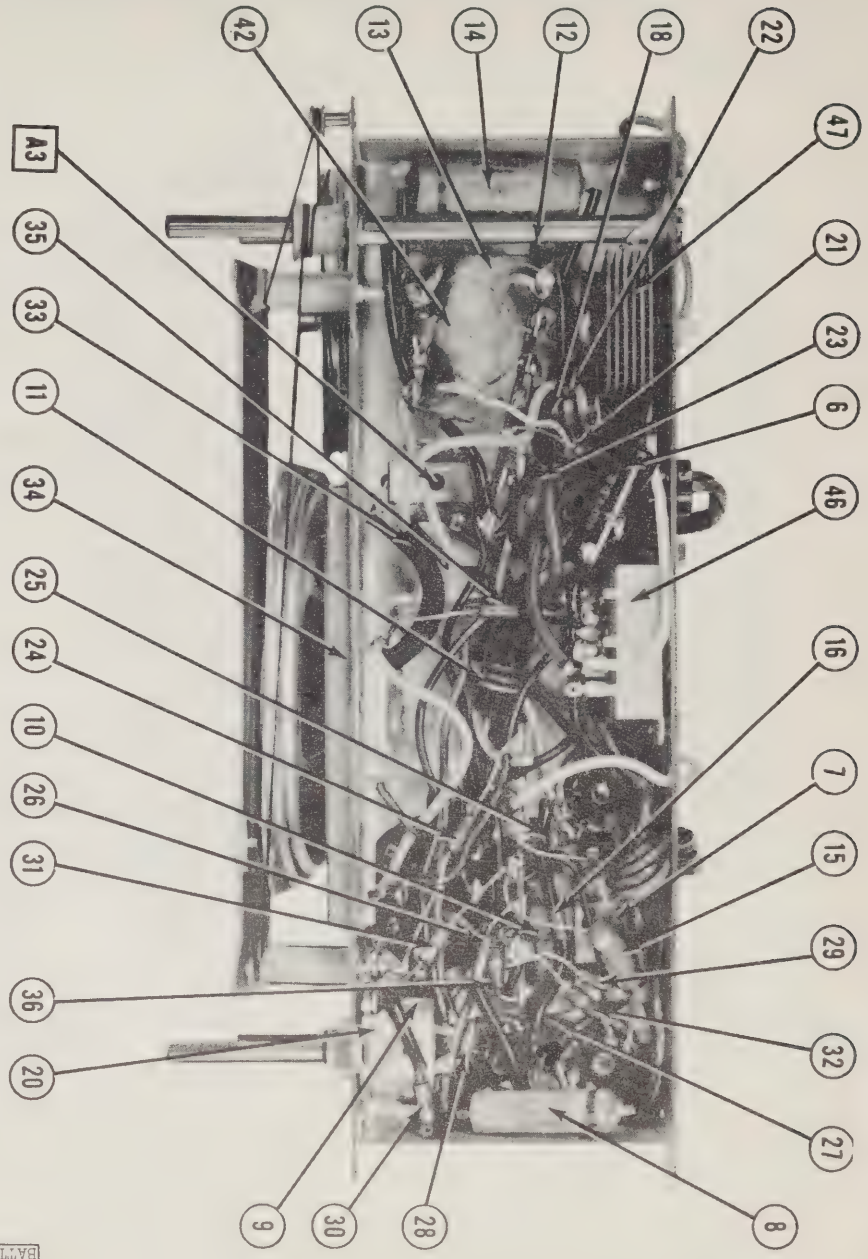
ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
45	7.5V "A" 90V "B"	P-361						T5Z60	

MISCELLANEOUS

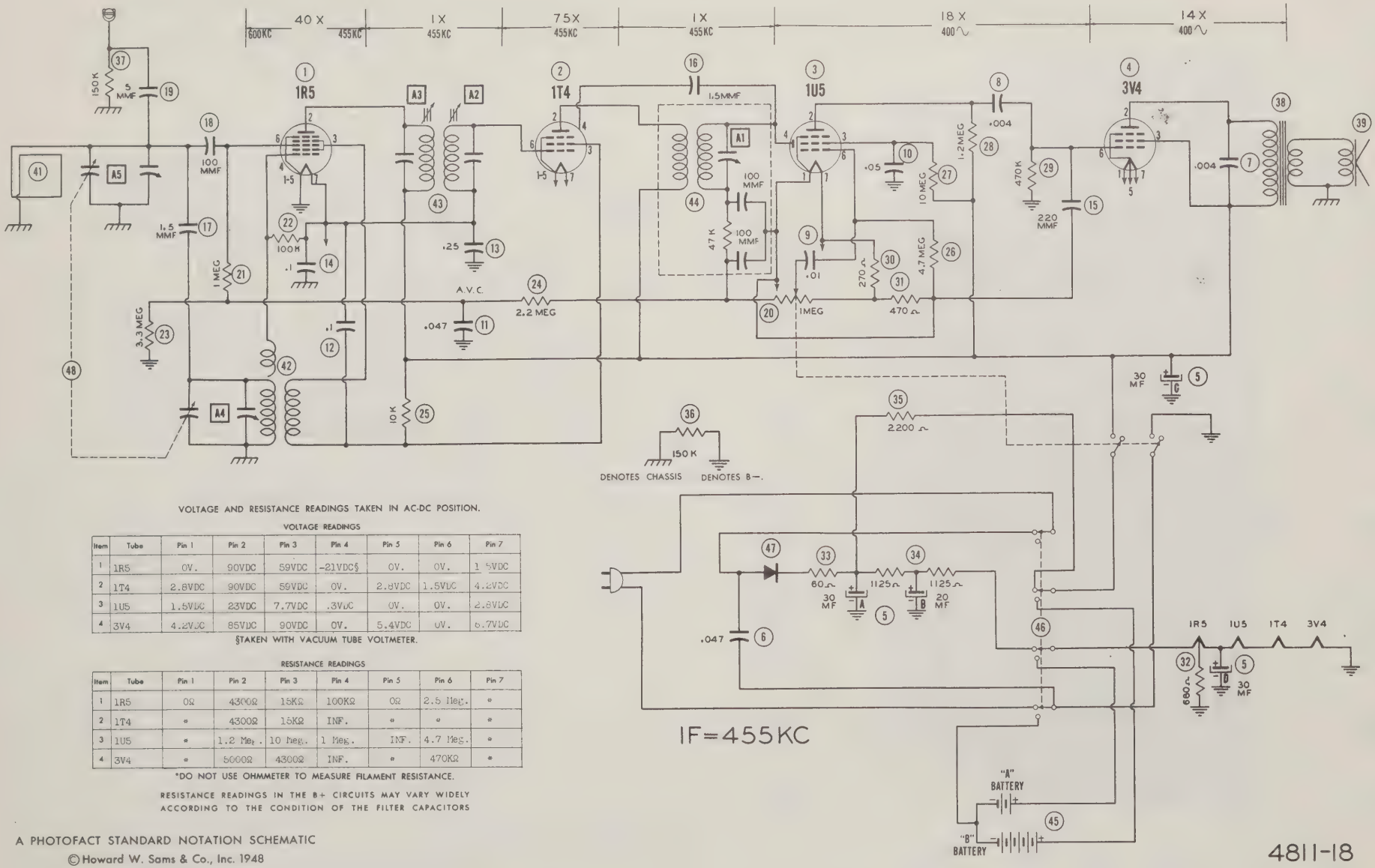
ITEM No.	PART NAME	PHILCO PART No.	NOTES
46	Switch	42-1821	AC/DC Batt.
47	Rectifier	34-80C3-1	Selenium
48	2 Gang Var. Cap.	31-2727-2	(27-496MMF, 24-165MMF)
	Dial Pointer	56-4362-2FCH	



CHASSIS—BOTTOM VIEW



PHILCO MODEL 49-602
BATTERY-LINE OPERATED



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	90VDC	59VDC	-21VDC§	0V.	0V.	1.5VDC
2	1T4	2.8VDC	90VDC	59VDC	0V.	2.8VDC	1.5VDC	4.2VDC
3	1U5	1.5VDC	23VDC	7.7VDC	.3VDC	0V.	0V.	2.8VDC
4	3V4	4.2VDC	85VDC	90VDC	0V.	5.4VDC	0V.	6.7VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	430ΩΩ	15KΩ	100KΩ	0Ω	2.5 Meg.	*
2	1T4	*	430ΩΩ	15KΩ	INF.	*	*	*
3	1U5	*	1.2 Meg.	10 Meg.	1 Meg.	INF.	4.7 Meg.	*
4	3V4	*	500ΩΩ	430ΩΩ	INF.	*	470KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to B-.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

REGAL MODEL
1107

REGAL MODEL
1107

REGAL MODEL 1107

TRADE NAME	Regal, Model 1107
MANUFACTURER	Regal Electronics Corp., 603 W. 130th St., New York, N.Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 12SA7 Converter, 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1650KC RATING .27 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD	High side to ext. ant. lead. Low side to B-.	1650KC	"	"	A3	Adjust for maximum output.
3	200MMFD	"	1500KC	Tune for maximum output.	"	A4	" " " "

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DATE 5/48-#4811-19 SET #41-FOLDER #19

PARTS LIST AND DESCRIPTIONS

REGAL MODEL 1107

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: REGAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
3	Power Output	50L6GT	50L6GT	7AC	
4	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: REGAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	40	150	60-106	PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Red
B	40	150						" "
6	.05	400	50-103	484-05	DT4S5	ST-4-05	TC-15	Line Filter
7	.01	600	50-102	684-01	DT6S1	ST-6-01	TC-11	Output Plate Bypass
8	.01	600	50-102	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
9	.005	400	50-101	484-005	DT6D5	ST-6-005	TC-25	" "
10	.01	600	50-102	684-01	DT6S1	ST-6-01	TC-11	Conv. Cathode Bypass
11	.2	400		484-.2	DT4P2	ST-4-2	72P3	Line Isolation
12	250	500	55-103	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
13	250	500	55-103	1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
14	100	500	55-102	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

CONTROLS

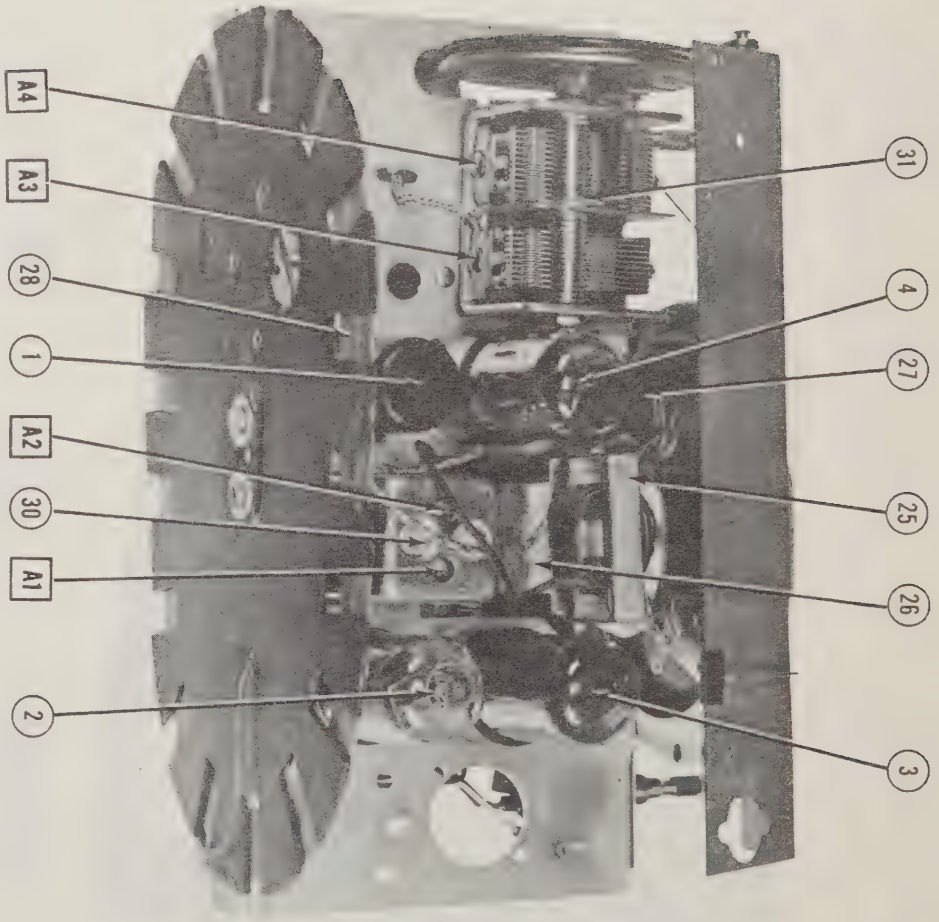
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: REGAL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
15A	500KΩ	½	20-101	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: REGAL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
16	15KΩ	½		BTS-15K	Br.-Grn.-Or. Oscillator Grid
17	120Ω	½	65-140	BW-½-120	Br.-Red-Br. Converter Cathode
18	220KΩ	½	65-142	BTS-220K	Red-Red-Yl. Line Isolation
19	8.2 Meg.	½		BTS-8.2 Meg.	Gray-Red-Grn. AF Grid-See Note 1
20	220KΩ	½		BTS-220K	Red-Grn.-Yl. AF Plate Load
21	330KΩ	½		BTS-330K	Or.-Or.-Yl. Output Grid
22	2400Ω	2	65-132	BT-2-2200	Red-Vi.-Red Filter
23	20Ω	½		BW-½-22	Red-Blk.-Blk. Rectifier Ballast-See Note 2
24	68Ω	2		BW-2-68	Blue-Gray-Blk. Line Dropping

Note 1-Some models use 10 Meg. in this application. IRC replacement BTS-10 Meg.
Note 2-Some models use 25Ω in this application. IRC replacement same as above.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		REGAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
25	2000Ω	3.3Ω	140Ω	.5Ω	T-800	A-3876*	T22S45*	A-2923*	*Bend mounting tabs down, file out slots and mount on original brackets.

SPEAKER

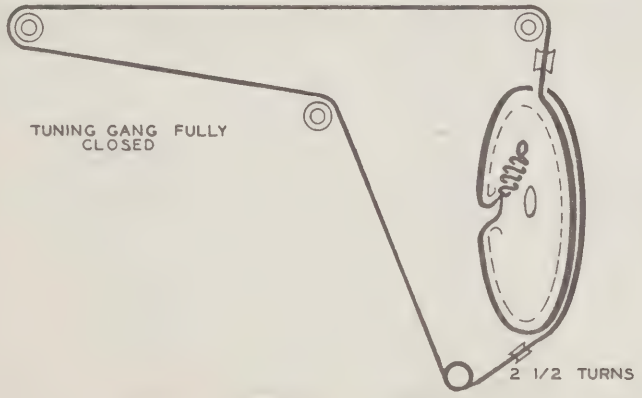
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			REGAL PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105		
26	PM	3.3Ω	110-106	Mod. P5-X	5A07	
	CONE DIA.	VC DIA.				
27	4-3/4"	1/2"				

R F COILS

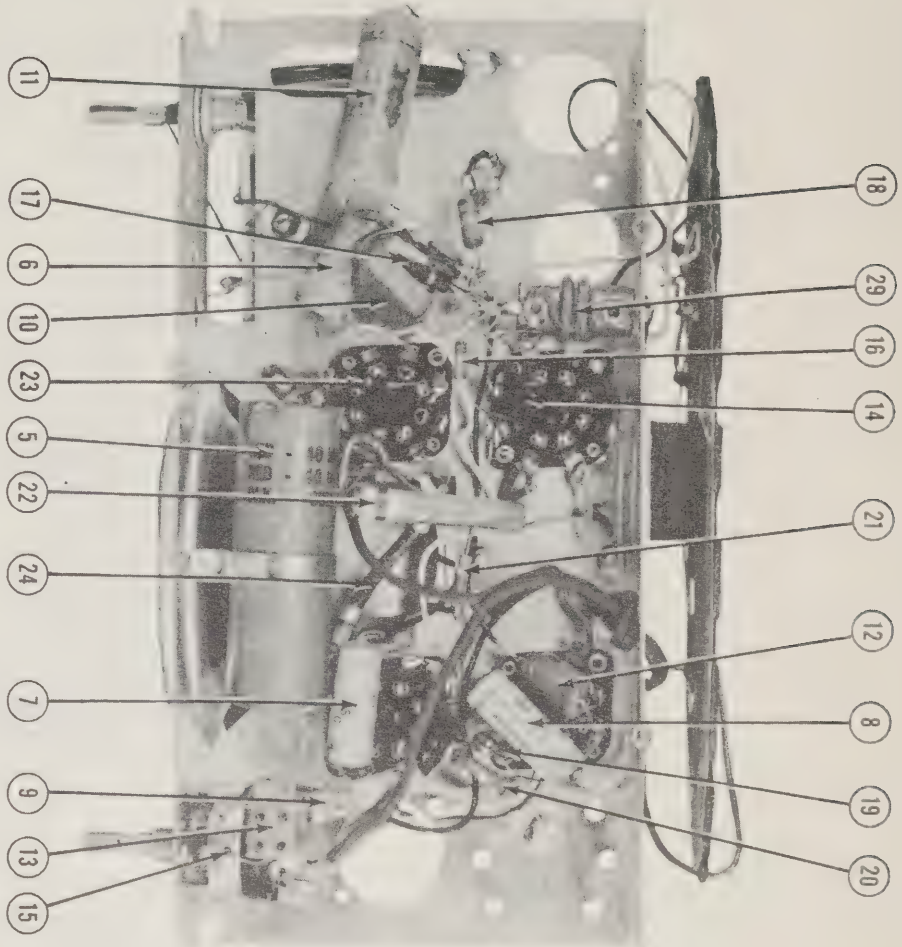
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	REGAL PART No.	MEISSNER PART No.	
28	Loop Ant.	.1Ω	3Ω	30-128		
29	Osc. Coil		5.2Ω	30-127	14-1060	
30	IF Trans.	22Ω	22Ω	30-129		

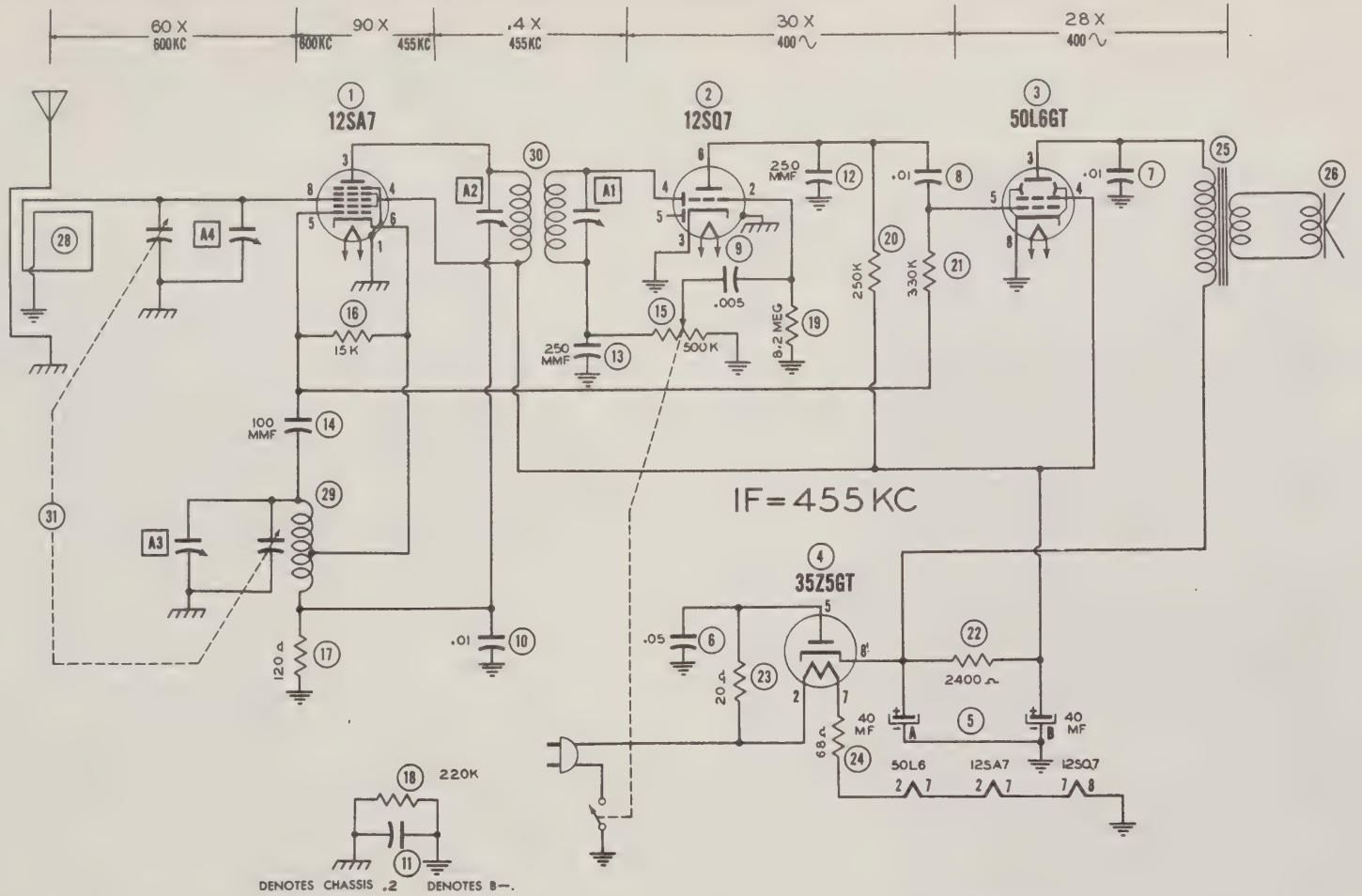
MISCELLANEOUS

ITEM No.	PART NAME	REGAL PART No.	NOTES
31	2 Gang Var. Cap.	40-101	(22-470MMF, 58-210MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	25VAC	92VDC	92VDC	-7VDC§	1.2VDC	12VAC	0V.
2	12SQ7GT	0V.	-.1VDC	0V.	-.8VDC	0V.	52VDC	12VAC	0V.
3	50L6GT	0V.	75VAC	118VDC	92VDC	-7VDC§	0V.	25VAC	0V.
4	35Z5GT	0V.	117VAC	110VAC	0V.	116VAC	0V.	§7VAC	125VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	26Ω	200KΩ	200KΩ	15KΩ	120Ω	13Ω	3Ω
2	12SQ7GT	220KΩ	10 Meg.	0Ω	500KΩ	0Ω	450KΩ	13Ω	0Ω
3	50L6GT	INF.	78Ω	200KΩ	200KΩ	340KΩ	INF.	26Ω	0Ω
4	35Z5GT	INF.	180Ω	170Ω	INF.	200Ω	INF.	150Ω	200KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4811-19

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

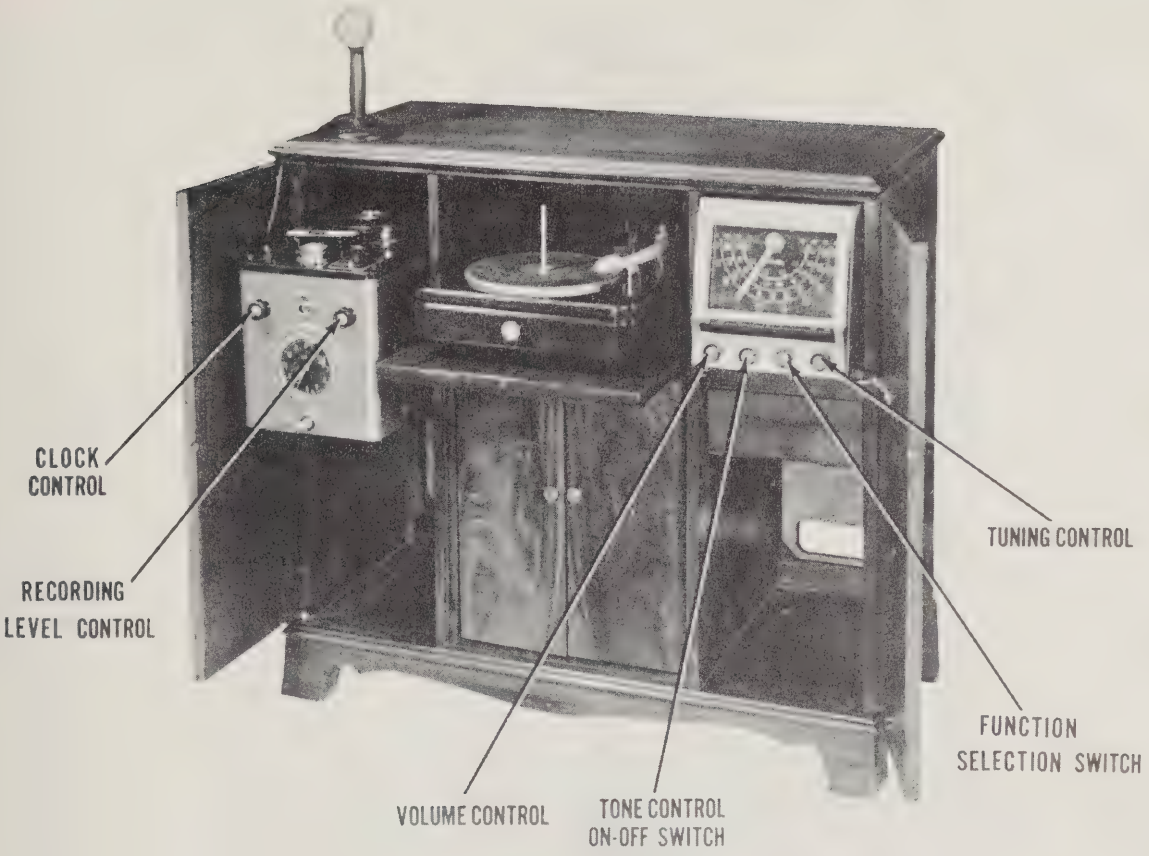
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

SILVERTONE MODELS 8127 (Ch. 101.831A), 8128 (Ch. 101.831), WIRE RECORD. AMP. (Ch. 101.773).

SILVERTONE MODELS 8127 (Ch. 101.831A), 8128 (Ch. 101.831), WIRE RECORD. AMP. (Ch. 101.773).



SILVERTONE MODELS 8127 (Ch. 101.831A), 8128 (Ch. 101.831), WIRE RECORD. AMP. (Ch. 101.773).

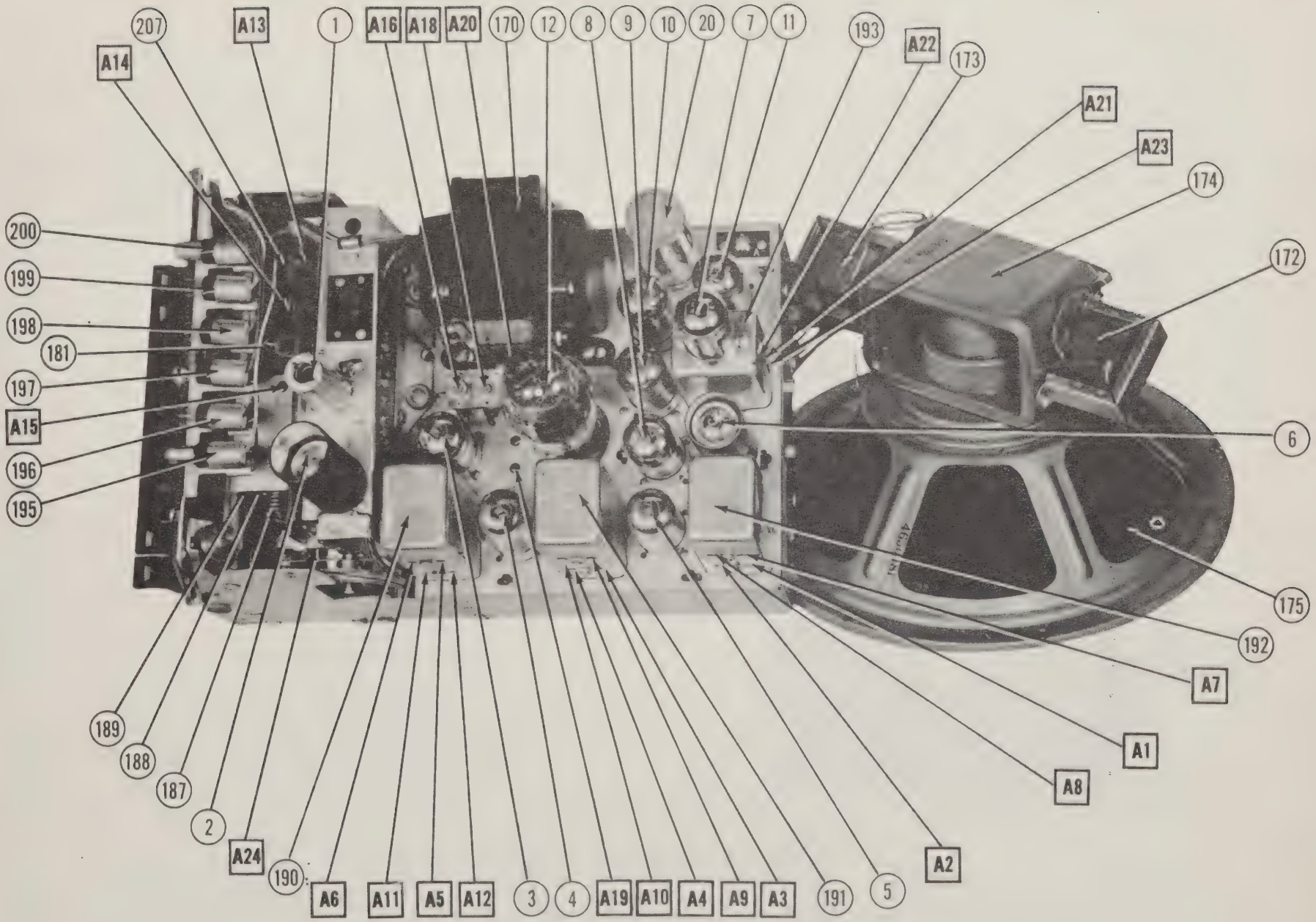
SILVERTONE MODEL 8127

TRADE NAME	Silvertone, Models 8127 (Ch. 101.831A), 8128 (Ch. 101.831), (Ch. 101.773) Amplifier.
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Wire Recorder-Multi-Band AM-FM Superheterodyne Receiver.
TUBES (NINETEEN)	Types, 6AG5 FM RF Amp., 7F8 FM Conv., 7N7 AM Conv., 7W7 1st IF Amp., 7W7 2nd IF Amp., 7C7 FM 3rd IF Amp., 7A6 FM Ratio Det., 7C6 AM Det.-AVC-Phase Inv., 7C7 AF Amp., (2) 7C5 Power Output, 5U4G Rectifier, 1273 1st AF Amp., 7A4 2nd AF Amp., 7C7 Power Output, 7N7 Ind. Amp., 6E5 Record Ind., 7C5 Erase Osc., 7Y4 Rectifier.
POWER SUPPLY	110-120 Volts AC
RATING	1.84 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1650KC SHORT WAVE 11.5-12.0MC, 14.5-15.4MC FREQ. MOD. 88-108MC.

HOWARD W. SAMS & CO., INC. • 2924 East Washington Street • Indianapolis 7, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 5/48-#4811-20 SET #41-FOLDER #20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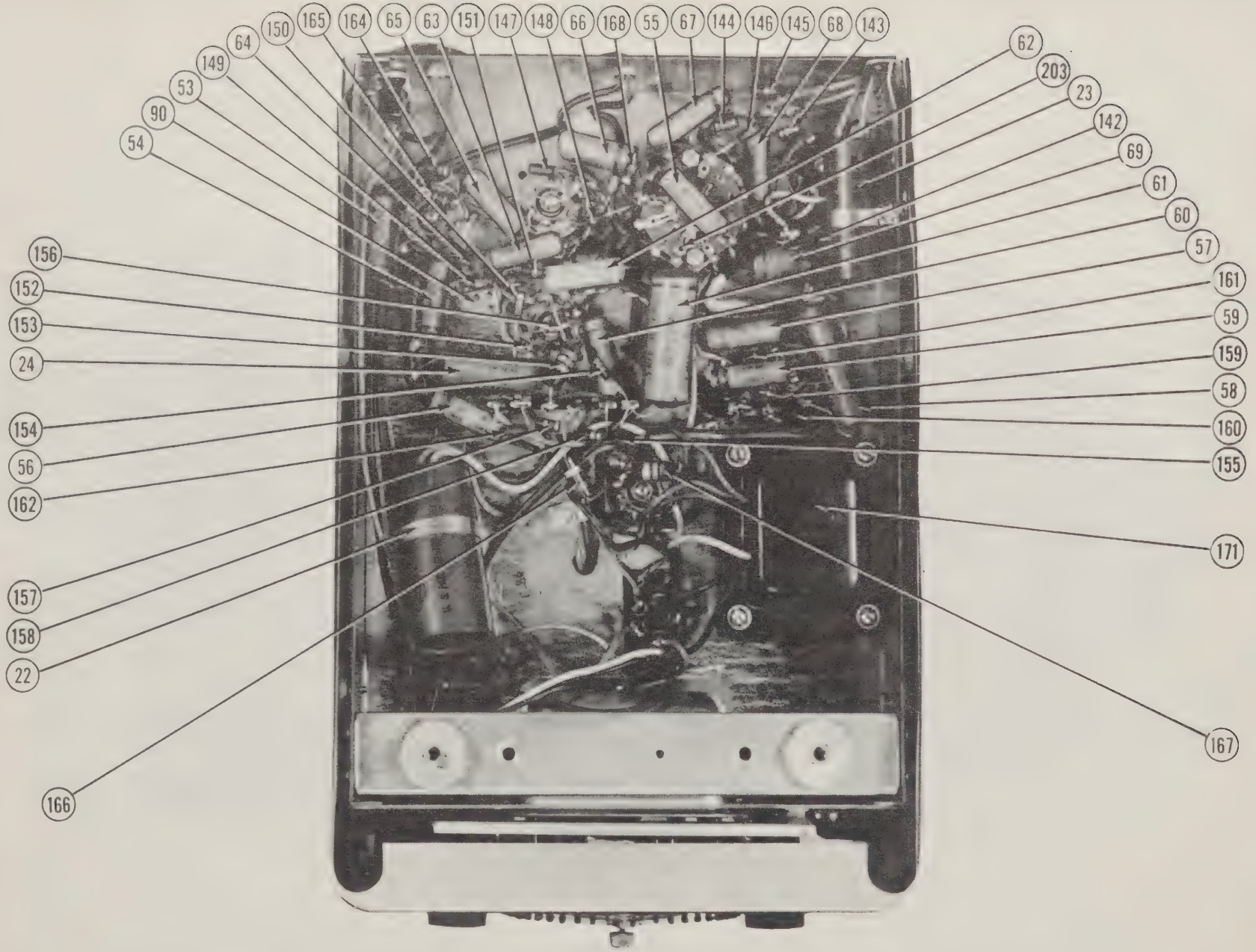
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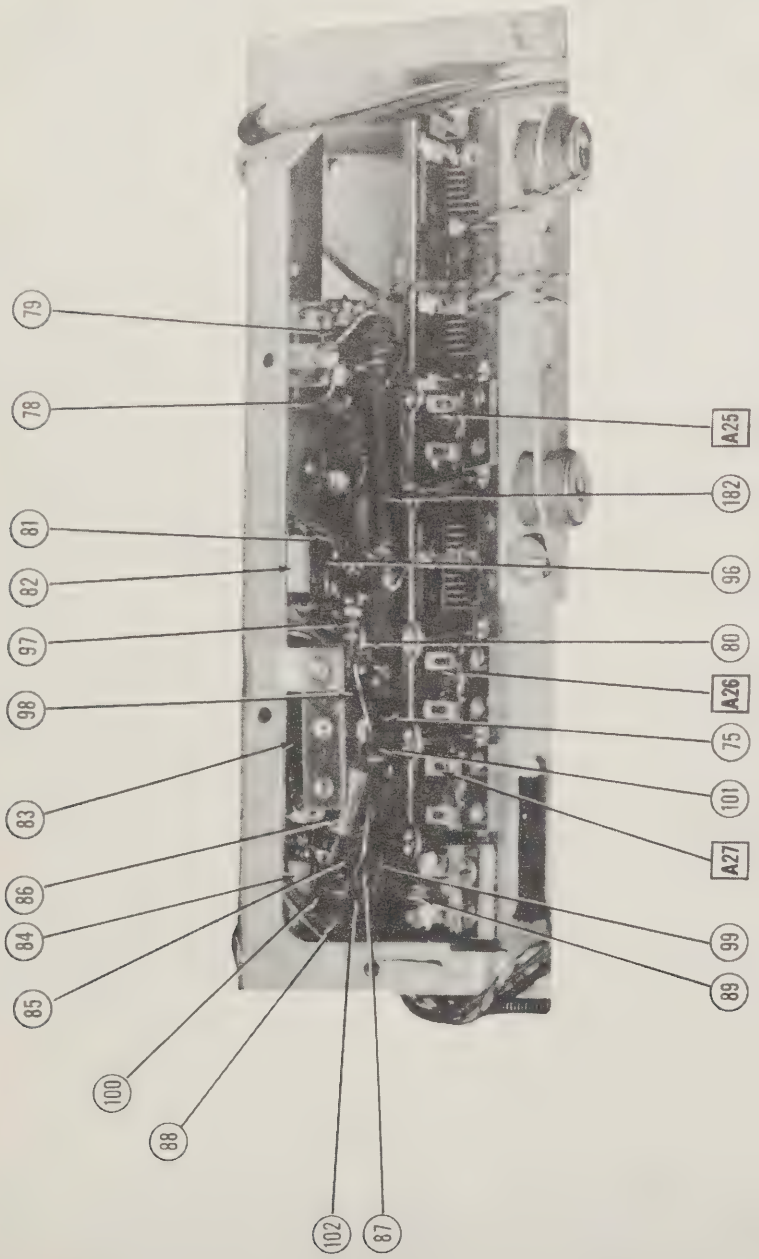
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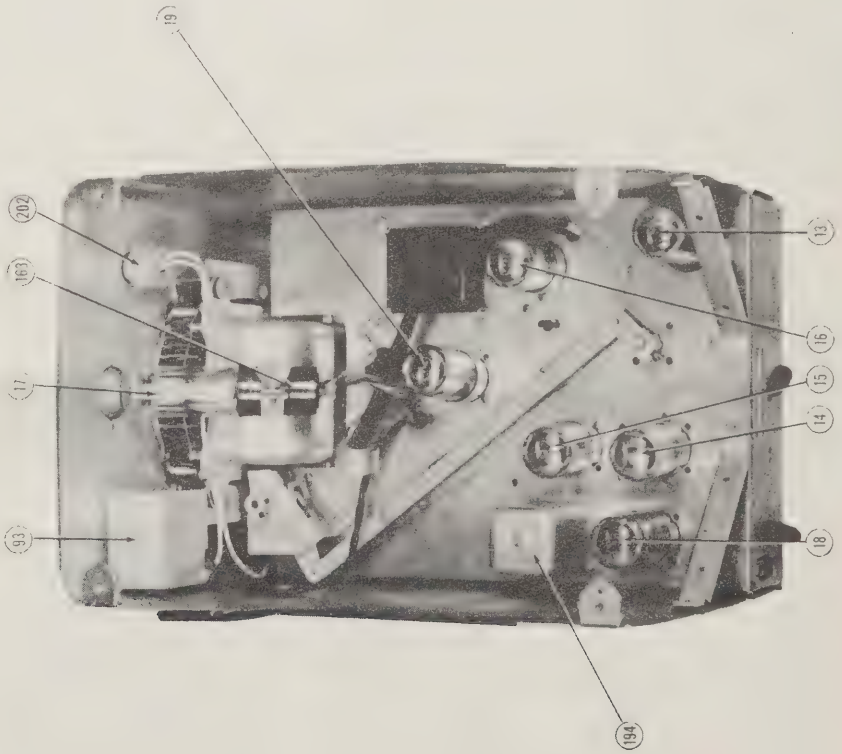
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6AG5	6AG5	7BD	
2	FM Conv.	7F8	7F8	8BW	
3	AM Conv.	7N7	7N7	8AC	
4	1st IF Amp.	7W7	7W7	8BJ	
5	2nd IF Amp.	7W7	7W7	8BJ	
6	FM 3rd IF Amp	7C7	7C7	8V	
7	FM Ratio Det.	7A6	7A6	7AJ	
8	AM Det.-AVC-Phase Inv.	7C6	7C6	8W	
9	AF Amp.	7C7	7C7	8V	
10	Power Output	7C5	7C5	6AA	
11	" "	7C5	7C5	6AA	
12	Rectifier	5U4G	5U4G	5T	
13	1st AF Amp.	1273	1273		
14	2nd AF Amp.	7A4	7A4	5AC	
15	Power Output	7C7	7C7	8V	
16	Indicator Amp.	7N7	7N7	8AC	
17	Record Indicator	6E5	6E5	6R	
18	Erase Osc.	7C5	7C5	6AA	
19	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
20A	30	375	R62107		UP222245*	DY-4x20-450*	EL-420*	◓ Filter
B	20	350						■ "
C	20	325						▲ "
21	2	50	R64915	PRS150-4	BR550	M-4-450	TA-55	Stabilizing Cap.
22A	30	350	R63689	PRS450-30	BR3045	M-30-450	UT-30	Filter-Yellow
B	30	250		PRS450-30	BR3045	M-30-450	UT-30	" -Red
23A	16	200	R63690	PRSA250-16-16	EDL1125	DH-2x16-450*	TA-216	Decoupling-Red
B	16	150						Screen Bypass-Blue
24	20	25	R63711	PRS25/25	BR202A	M-25-25	TA-25	Output Cathode Bypass
25	.02	200		484-02	DT4S2	ST-4-02	TC-12	Fil. Bypass
26	.05	600		684-05	DT6S5	ST-6-05	TC-15	Tone Comp.
27	.05	600		684-05	DT6S5	ST-6-05	TC-15	" "
28	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
29	.05	400		484-05	DT4S5	ST-4-05	TC-15	" "
30	.01	400		484-01	DT4S1	ST-4-01	TC-11	Tone Compensation
31	.05	400		484-05	DT4S5	ST-4-05	TC-15	AF Screen Bypass
32	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
33	.01	400		484-01	DT4S1	ST-4-01	TC-1	Tone Compensation
34	.01	400		484-01	DT4S1	ST-4-01	TC-1	" "
35	.01	400		484-01	DT4S1	ST-4-01	TC-1	Audio Coupling
36	.05	400		484-05	DT4S5	ST-4-05	TC-15	3rd IF Plate Decoup.
37	.02	400		484-02	DT4S2	ST-4-02	TC-12	3rd IF Screen Bypass
38	.02	200		484-02	DT4S2	ST-4-02	TC-12	3rd IF Grid Filter
39	.1	400		484-.1	DT4P1	ST-4-1	TC-1	RF Bypass Pwr. Supply
40	.02	400		484-02	DT4S2	ST-4-02	TC-12	2nd IF Plate Decoup.
41	.02	400		484-02	DT4S2	ST-4-02	TC-12	2nd IF Screen Bypass
42	.02	400		484-02	DT4S2	ST-4-02	TC-12	2nd IF Cathode Bypass
43	.01	400		484-01	DT4S1	ST-4-01	TC-11	1st IF Plate Decoup.
44	.01	400		484-01	DT4S1	ST-4-01	TC-11	1st IF Screen Bypass
45	.01	400		484-01	DT4S1	ST-4-01	TC-11	1st IF Cathode Bypass
46	.02	400		484-02	DT4S2	ST-4-02	TC-12	1st IF Grid Filter
47	.005	400		484-005	DT6D5	ST-6-005	TC-25	Conv. Plate Bypass
48	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Muting Capacitor
49	.01	400		484-01	DT4S1	ST-4-01	TC-11	Conv. Cathode Bypass
50	.01	400		484-01	DT4S1	ST-4-01	TC-11	Osc. Plate Bypass
51	.05	200		484-05	DT4S5	ST-4-05	TC-15	RF Coupling
52	.01	400		484-01	DT4S1	ST-4-01	TC-11	AVC Filter
53	.002	600		684-002	DT6D2	ST-6-002	TC-22	Erase Osc. Grid Cap.
54	.003	600		684-003	DT6D3	ST-6-003	TC-23	Erase Osc. Coupling
55	.001	600		684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
56	.05	200		484-05	DT4S5	ST-4-05	TC-15	Rec. Ind. Grid Filter
57	.01	400		484-01	DT4S1	ST-4-01	TC-11	Diode Filter
58	.25	400		484-.25	DT4P25	ST-4-25	TC-2	Audio Coupling

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	IDENTIFICATION CODES
120	22KΩ	½		BTS-22K	Red-Red-Or. 3rd IF Grid
121	82KΩ	1		BTA-82K	Gray-Red-Or. 3rd IF Screen Dropping
122	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 3rd IF Plate Decoupling
123	33KΩ	½		BTS-33K	Or.-Or.-Or. Bleeder
124	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue AF Grid
125	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. AF Screen Dropping
126	270KΩ	½		BTS-270K	Red-Vi.-Yl. AF Plate Load
127	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Grid
128	180KΩ	½		BTS-180K	Br.-Gray-Yl. Phase Inverter Plate Load
129	270KΩ	½		BTS-270K	Red-Vi.-Yl. Output Grid
130	330KΩ	½		BTS-330K	Or.-Or.-Yl. " "
131	47Ω	½		BW-½-47	Yl.-Vi.-Blk. Parasitic Suppressor
132	47Ω	½		BW-½-47	Yl.-Vi.-Blk. " "
133	5600Ω	1		BTA-5600	Grn.-Blue-Red Tone Compensation
134	5600Ω	1		BTA-5600	Grn.-Blue-Red " "
135	100Ω	2	R61219	BW-2-100	Br.-Blk.-Br. Filter
136	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Voltage Divider
137	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. Tone Compensation
138	56KΩ	½		BTS-56K	Grn.-Blue-Or. " "
139	56KΩ	½		BTS-56K	Grn.-Blue-Or. " "
140	1.1Ω	½	R63294	BW-½-1.0	Br.-Br.-Gold Series Pilot Light
141	2.2Ω	½	R63293	BW-½-2.2	Red-Red-Gold Series Pilot Light
142	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. 1st AF Grid
143	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 1st AF Screen Dropping
144	33KΩ	½		BTS-33K	Or.-Or.-Or. 1st AF Plate Load
145	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Decoupling
146	15KΩ	½		BTS-15K	Br.-Grn.-Or. 1st AF Decoupling
147	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue 2nd AF Grid
148	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd AF Plate Load
149	680KΩ	½		BTS-680K	Blue-Gray-Yl. Tone Compensation
150	22KΩ	½		BTS-22K	Red-Red-Or. Output Grid
151	100KΩ	2		BTS-100K	Br.-Blk.-Yl. " "
152	270Ω	½		BW-½-270	Red-Vi.-Br. Output Cathode
153	18KΩ	2		BT-2-18K	Br.-Gray-Or. Output Screen Dropping
154	12KΩ	½		BTS-12K	Br.-Red-Or. Tone Compensation
155	18KΩ	½		BTS-18K	Br.-Gray-Or. Output Plate Load
156	8200Ω	1		BTA-8200	Gray-Red-Red Bleeder
157	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Ind. Amp. Grid
158	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " " "
159	1200Ω	½		BTS-1200	Br.-Red-Red Ind. Amp. Cathode
160	10KΩ	½		BTS-10K	Br.-Blk.-Or. Ind. Amp. Plate Load
161	8200Ω	½		BTS-8200	Gray-Red-Red Diode Load
162	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue Rec. Ind. Grid
163	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Rec. Ind. Plate Load
164	47Ω	2		BW-½-47	Yl.-Vi.-Blk. Parasitic Suppressor
165	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Erase Oscillator Grid
166	5600Ω	2		BT-2-5600	Grn.-Blue-Red Filter
167	18KΩ	2		BT-2-18K	Br.-Gray-Or. "
168	3300Ω	½		BTS-3300	Or.-Or.-Red Bias Coupling
169	200Ω	3		AB-200	Red-Blk.-Br. Output Cathode

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: SILVERTONE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
170	117VAC @ 1.04A	600VCT @ .15A	5.2VAC @ 3.0A	6.3VAC @ 4.0A	R62149	P-6014#	T22R331†	
171	117VAC @ .8A	500VCT @ .04A	6.5VAC @ 3.0A		R63616	P-6297	T22R00	P-2947

†Drill new mounting holes.
#Add series resistor to reduce plate voltage.

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: SILVERTONE PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
172	.065A	380Ω	11 Henries	R62175	C-1709	T20C53	C-2090†	†Drill new mounting holes.

PARTS LIST AND DESCRIPTIONS (Continued)

59	.001	600		684-001	DT6D1	ST-6-001	TC-21	Grid Bypass
60	.001	600		684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
61	.5	400		484-.5	DT4P5	ST-4-.5	TC-5	" "
62	.02	200		484-02	DT4S2	ST-4-02	TC-12	Tone Comp.
63	.003	600		684-003	DT6D3	ST-6-003	TC-23	" "
64	.005	400		484-005	DT6D5	ST-6-005	TC-25	Audio Coupling
65	.001	600		684-001	DT6D1	ST-6-001	TC-21	2nd AF Plate Bypass
66	.05	200		484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
67	.02	400		484-02	DT4S2	ST-4-02	TC-12	" "
68	.02	400		484-02	DT4S2	ST-4-02	TC-12	1st AF Plate Decoup.
69	.5	100		484-.5	DT4P5	ST-4-.5	TC-5	Audio Coupling
70	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	AF Plate Bypass
71	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Tone Comp.
72	150	500		1468-00015	5W5T15	MO.5-315	1FM-315	" "
73	750	300		1468-00075	1W5T7	MO.3-37	1FM-37	De-emphasis-Silver
74	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Diode Filter
75	1000	300		1468-001	1W5D1	MO.5-21	1FM-21	FM Conv. Plate Decoup-Cer.
76	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
77	25	500		1468-000025	5W5Q25	MO.5-425	1FM-425	RF Coupling
78	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	" " -Silver
79	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
80	600	300			1W5T6	MO.5-36	MS-36	RF Screen Bypass-Cer.
81	600	300			1W5T6	MO.5-36	MS-36	RF Cathode Bypass-Cer.
82	600	300			1W5T6	MO.5-36	MS-36	RF Plate Decoup.-Cer.
83	10	300		1468-00001	5W5Q1	MO.5-41	MS-41	FM Conv. Plate Decoup.-Cer.
84	1000	300		1468-001	1W5D1	MO.5-21	1FM-21	FM Conv. Cathode Byp.- "
85	600	300			1W5T6	MO.5-36	MS-36	FM Conv. Grid Filter - "
86	600	300			1W5T6	MO.5-36	MS-36	FM Conv. Plate Decoup.- "
87	20	300		1468-000025	5W5Q2	MO5.5-42	MS-42	FM Osc. Grid Cap. - "
88	20	300		1468-000025	5W5Q2	MO5.5-42	MS-42	FM Osc. Feedback - "
89	1	300						Fixed Trimmer - "
90	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Audio Coupling

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	
91A	2 Meg.	½	R61363	D13-139XX		Volume Control tapped @ 400KΩ & 800KC
B	Shaft		Not Req.	E		Attach to 91A per instructions.
92A	1 Meg.	½	R61362	D13-137	AM-63-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 92A per instructions.
C	Switch		" "	41	SW-A	" " " " "
93A	500KΩ	½	R63685	D13-133	M-60-Z	Record level control
B	Shaft		Not Req.	A	Not Req.	Attach to 93A per instructions.
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	
94	100KΩ	½		BTS-100K	Br.-Blk.-Yl. BC Converter Grid
95	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
96	220Ω	½			Red-Red-Br. FM-RF Cathode
97	47KΩ	½		BTS-47K	Yl.-Vi.-Or. FM-RF Screen Dropping
98	2200Ω	½		BTS-2200	Red-Red-Red FM-RF Plate Decoupling
99	2200Ω	½		BTS-2200	Red-Red-Red FM Converter Grid
100	1500Ω	½		BTS-1500	Br.-Grn.-Red FM Converter Cathode
101	10KΩ	1		BTA-10K	Br.-Blk.-Or. FM Oscillator Plate Load
102	47KΩ	½		BTS-47K	Yl.-Vi.-Or. FM Oscillator Grid
103	470Ω	½		BTS-470	Yl.-Vi.-Br. Muting Network
104	27KΩ	½		BTS-27K	Red-Vi.-Or. BC Oscillator Grid
105	10KΩ	1		BTA-10K	Br.-Blk.-Or. BC Oscillator Plate Load
106	1200Ω	½		BTS-1200	Br.-Red-Red BC Converter Cathode
107	27KΩ	½		BTS-27K	Red-Vi.-Or. BC Converter Plate Load
108	2200Ω	½		BTS-2200	Red-Red-Red FM Converter Plate Decoupling
109	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
110	15 Meg.	½		BTS-15 Meg.	Br.-Grn.-Blue Muting Network
111	180Ω	½			Br.-Gray-Br. 1st IF Cathode
112	33KΩ	½		BTS-33K	Or.-Or.-Or. 1st IF Screen Dropping
113	2200Ω	½		BTS-2200	Red-Red-Red 1st IF Plate Decoupling
114	180Ω	½			Br.-Gray-Br. 2nd IF Cathode
115	33KΩ	½		BTS-33K	Or.-Or.-Or. 2nd IF Screen Dropping
116	2200Ω	½		BTS-2200Ω	Red-Red-Red 2nd IF Plate Decoupling
117	56KΩ	½		BTS-56K	Grn.-Blue-Or. AVC Network
118	33KΩ	½		BTS-33K	Or.-Or.-Or. Diode Load
119	12KΩ	½		BTS-12K	Br.-Red-Or. " "

DATE 5/48-#4811-20 SET #41-FOLDER #20

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
173	9700Ω CT	3.8Ω	420Ω CT	.7Ω	R62174	A-3824	T22856	A-2904†	†Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-673**		**Replace output transformer to match 6-8 voice coil.
174	PM	3.8Ω	R61383	Mod. P12-C	12A6	
	CONE DIA.	VC DIA.				
175	11-7/8"	1-1/2"	R62157			

R F COILS

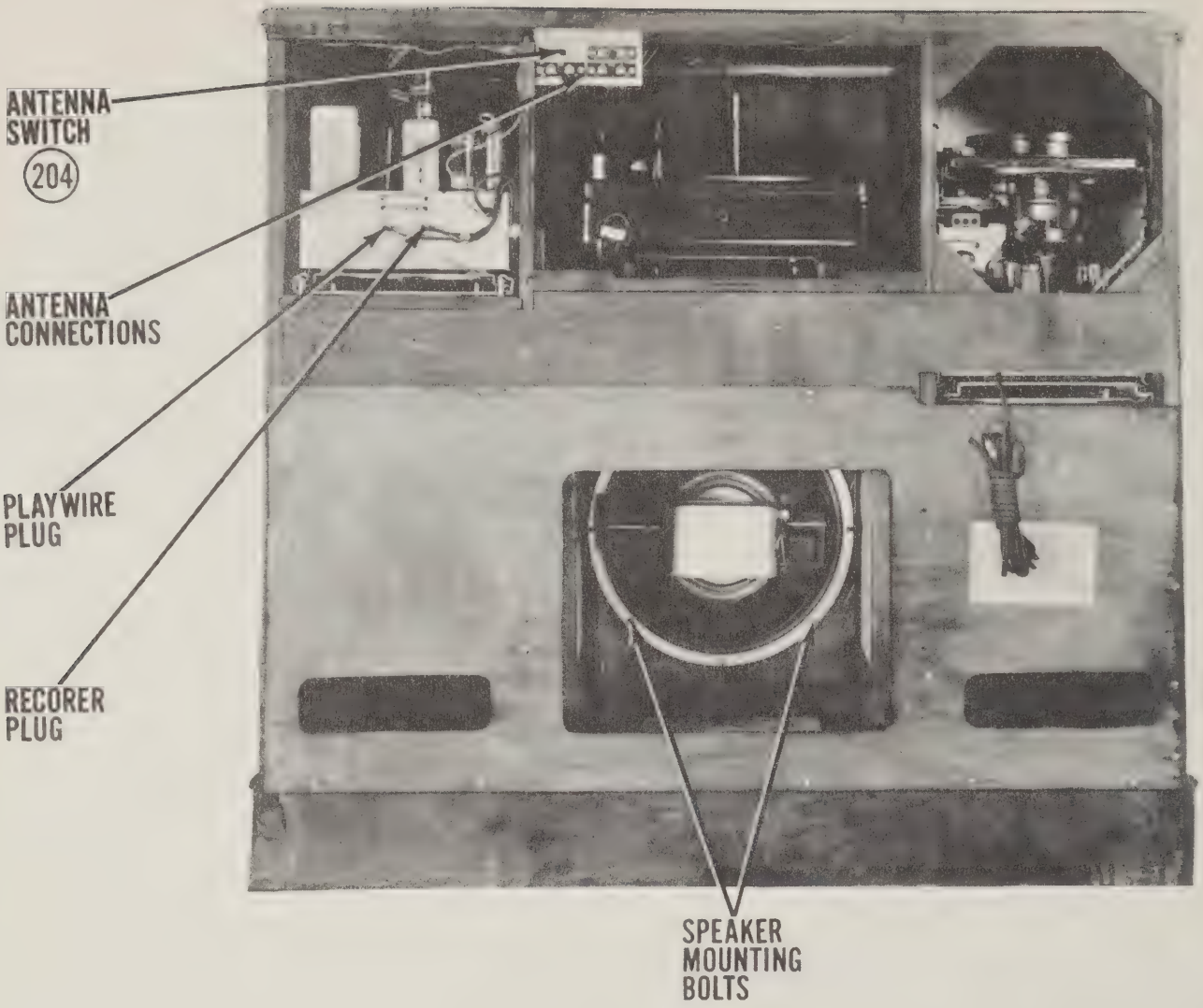
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SILVERTONE PART No.	MEISSNER PART No.	
176	Loop Ant. Pri.		0Ω	R62938		
177	Loop Ant. Sec.		0Ω	R62939		
178	SW Ant.			R62930		
179	FM "		0Ω	R62932		
180	SW Ant.Coil		0Ω	R62141		
181	FM " "		0Ω	R62133		
182	BC Loop Load. Coil		2.7Ω	R62106		
183	BC Coupling Coil		.1Ω	R62142		
184	BC RF Coil		2.6Ω	R62105		
185	BC Osc.Coil		1.7Ω	R62104	14-1060	
186	SW " "		0Ω	R62140	14-1066	
187	FM " "		0Ω	R62136		
188	FM RF Grid Coil		0Ω	R62135		
189	FM RF Plate Coil		0Ω	R62134		
190A	AM 1st IF	INF.	12Ω‡	R62146		‡Includes both sec.
B	FM " "	.6Ω				
191A	AM 2nd IF	14Ω§	12Ω	R62147		§Includes both pri.
B	FM " "		.6Ω			
192A	AM 3rd IF	18Ω§		R62148		
B	FM " "					
193	Disc. Trans.	1Ω	.5Ω	R60736		
194	Erase Osc. Coil		5Ω	R63693		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					SILVERTONE PART No.		
195-200	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
201	Switch	R42693	Band
202	"	R63684	Clock-Manual
203	"	R63687	Play-Record
204	"		Ant.
205	"	R62109	PB (Bass Boost)
206	"	R62108	PB (High Boost)
207	3 Gang Var. Cap.	R61361	(27-379MMF) each section
A16, A18, A20	Trimmer Strip	R62139	BC Osc. Pad.; SW 1 Ant. Adj.; SW 2 " "
A17, A19	" "	R62138	SW 1 Osc. Adj.; SW 2 " "
	Dial Scale	R62144	
	Dial Pointer	R61335	



DISASSEMBLY INSTRUCTIONS

1. Remove fifteen wood screws holding panel on back of cabinet. Remove panel from cabinet.
2. Slide record changer out front of cabinet as far as possible.
3. Remove three wood screws holding metal panel to side of record changer compartment.
4. Remove phono-pickup plug from chassis.
5. Remove phono-motor plug from chassis.
6. Remove speaker plug from chassis.
7. Remove playwire plug from tuning chassis.
8. Remove microphone plug from tuning chassis.
9. Remove AC power plug from wire recorder amp.
10. Remove antenna leads from tuning chassis.
11. Remove FM antenna plug from tuning chassis.
12. Remove four hex head screws holding tuning chassis in cabinet. Slide chassis out back of cabinet.
13. Remove four hex head screws holding wire recorder in cabinet. Remove wire recorder out front of cabinet.
14. Remove four Phillips head wood screws holding speaker in cabinet. Remove speaker from cabinet.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	0V.	2VDC	0V.	6.3VAC	242VDC	185VDC	2VDC	-
‡	2	7F8	-7VDC§	6.3VAC	167VDC	0V.	-9VDC	262VDC	0V.	-2.4VDC
	3	7N7	6.3VAC	5.5VDC	150VDC	0V.	-18VDC	167VDC	0V.	0V.
	4	7W7	6.3VAC	262VDC	150VDC	2.4VDC	0V.	0V.	2.4VDC	0V.
	5	7W7	6.3VAC	262VDC	135VDC	2VDC	0V.	0V.	2VDC	0V.
‡	6	7C7	6.3VAC	10VDC	50VDC	0V.	0V.	-.2VDC	0V.	0V.
‡	7	7A6	6.3VAC	1VDC	.5VDC	0V.	0V.	0V.	.5VDC	0V.
	8	7C6	6.3VAC	130VDC	-.3VDC	0V.	0V.	-.3VDC	0V.	0V.
	9	7C7	6.3VAC	214VDC	33VDC	0V.	0V.	-.5VDC	0V.	0V.
	10	7C5	0V.	290VDC	290VDC	290VDC	0V.	-.1VDC	16.5VDC	6.3VAC
	11	7C5	0V.	290VDC	280VDC	290VDC	-.3VDC	-.1VDC	16.5VDC	6.3VAC
	12	5U4G	0V.	320VDC	280VDC	300VAC	280VDC	300VAC	0V.	320VDC
*	13	1273	6.5VAC	60VDC	28VDC	0V.	0V.	-.5VDC	0V.	0V.
*	14	7A4	6.5VAC	28VDC	28VDC	28VDC	0V.	-.5VDC	0V.	0V.
*	15	7C7	6.5VAC	120VDC	60VDC	.9VDC	0V.	0V.	.9VDC	0V.
*	16	7N7	6.5VAC	0V.	-1.5VDC	-1.5VDC	0V.	230VDC	7.5VDC	0V.
*	17	6E5	6.5VAC	52VDC	-1.5VDC	282VDC	0V.	0V.	-	-
*	18	7C5	6.5VAC	282VDC	282VDC	282VDC	-50VDC	-50VDC	0V.	0V.
	19	7Y4	6.5VAC	282VDC	250VAC	282VDC	210VDC	250VAC	282VDC	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡	1	6AG5	0Ω	220Ω	0Ω	.1Ω	100KΩ	150KΩ	220Ω	-
‡	2	7F8	47KΩ	.1Ω	100KΩ	0Ω	1.5KΩ	100KΩ	0Ω	2.2KΩ
	3	7N7	.1Ω	1.2KΩ	125KΩ	2.3 Meg.	27KΩ	100KΩ	.5Ω	0Ω
	4	7W7	.1Ω	100KΩ	130KΩ	180Ω	0Ω	1 Meg.	180Ω	0Ω
	5	7W7	.1Ω	100KΩ	130KΩ	180Ω	0Ω	14Ω	180Ω	0Ω
‡	6	7C7	.1Ω	200KΩ	33KΩ	0Ω	0Ω	22KΩ	0Ω	0Ω
‡	7	7A6	.1Ω	70KΩ	INF.	INF.	0Ω	.5Ω	INF.	0Ω
	8	7C6	.1Ω	280KΩ	100KΩ	0Ω	0Ω	120KΩ	0Ω	0Ω
	9	7C7	.1Ω	370KΩ	1.8 Meg.	0Ω	0Ω	18 Meg.	0Ω	0Ω
	10	7C5	0Ω	100KΩ	100KΩ	100KΩ	INF.	370KΩ	200Ω	.1Ω
	11	7C5	0Ω	100KΩ	100KΩ	100KΩ	100KΩ	430KΩ	2200Ω	.1Ω
	12	5U4G	INF.	100KΩ	100KΩ	50Ω	100KΩ	52Ω	INF.	100KΩ
*	13	1273	.1Ω	175KΩ	510KΩ	0Ω	0Ω	1 Meg.	0Ω	0Ω
*	14	7A4	.1Ω	275KΩ	275KΩ	275KΩ	0Ω	15 Meg.	0Ω	0Ω
*	15	7C7	.1Ω	55KΩ	8.2KΩ	270Ω	0Ω	120KΩ	270Ω	0Ω
*	16	7N7	.1Ω	8.2KΩ	15 Meg.	15 Meg.	470KΩ	40KΩ	1.2KΩ	0Ω
*	17	6E5	.1Ω	1 Meg.	15 Meg.	26KΩ	0Ω	0Ω	-	-
*	18	7C5	.1Ω	26KΩ	26KΩ	30KΩ	48KΩ	48KΩ	0Ω	0Ω
	19	7Y4	.1Ω	26KΩ	150Ω	26KΩ	36KΩ	165Ω	26KΩ	0Ω

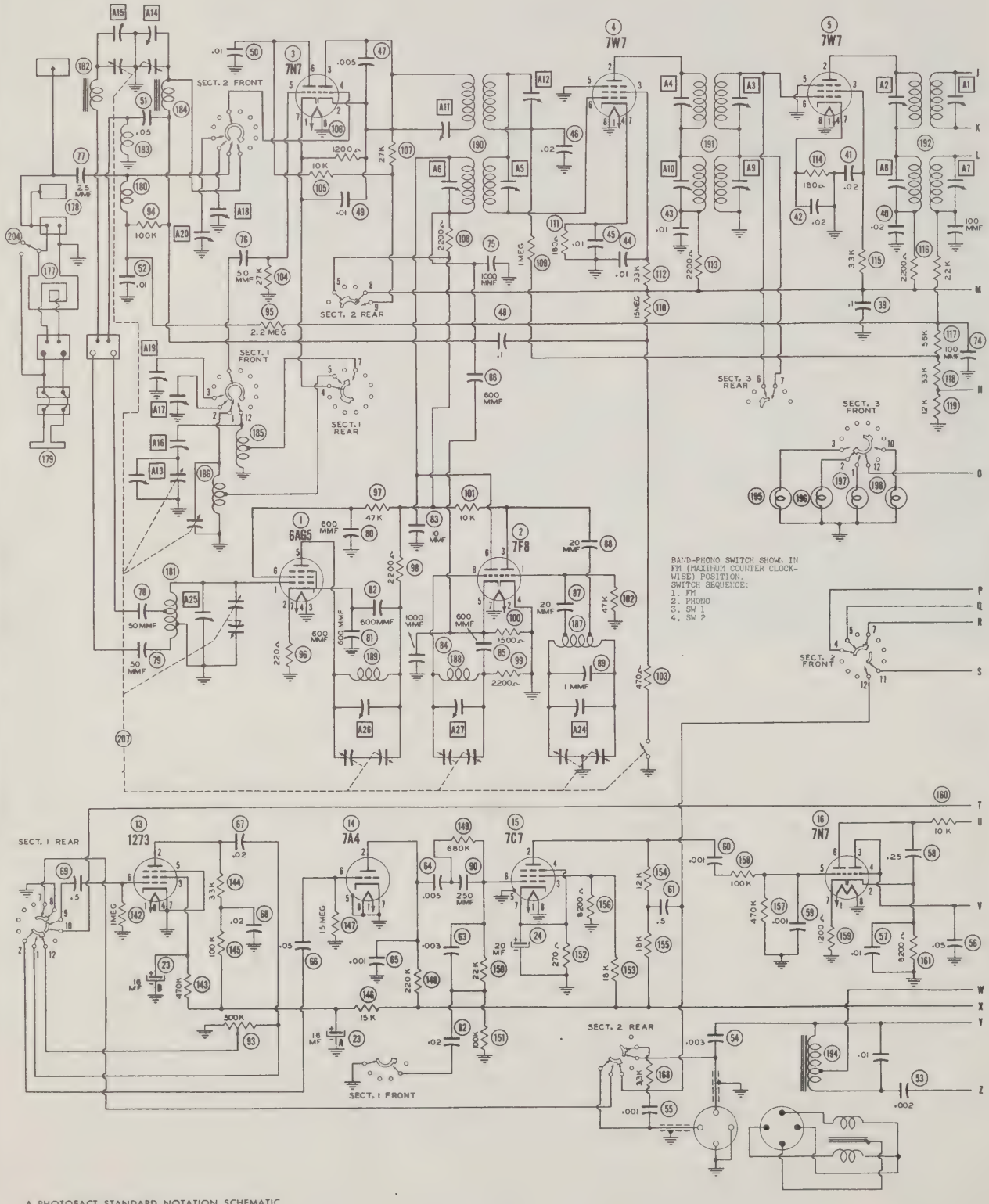
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

*VOLTAGE AND RESISTANCE READINGS TAKEN IN RECORD POSITION.

VOLTAGE AND RESISTANCE READINGS ON TIMER UNIT TAKEN IN MANUAL SWITCH POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



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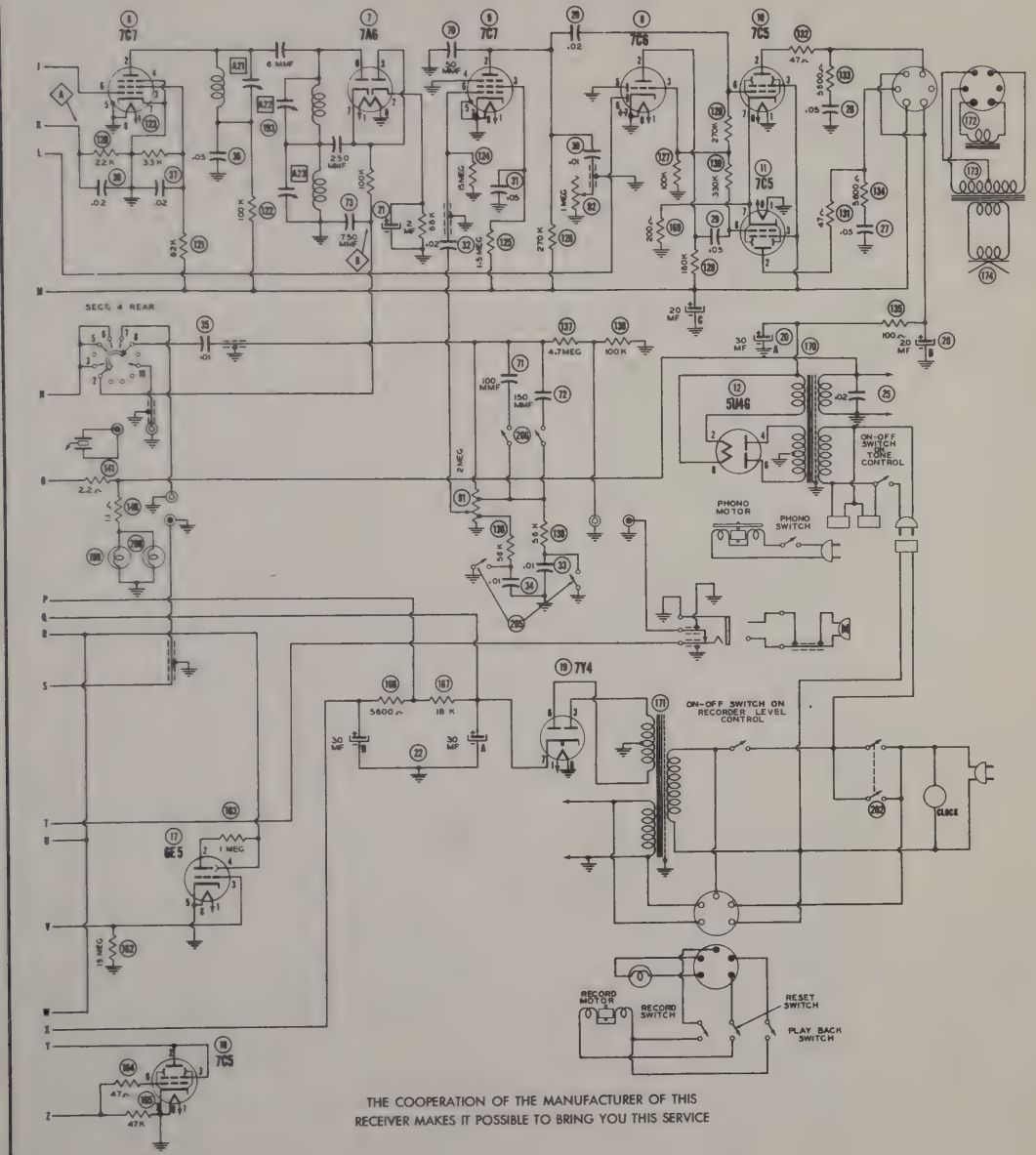

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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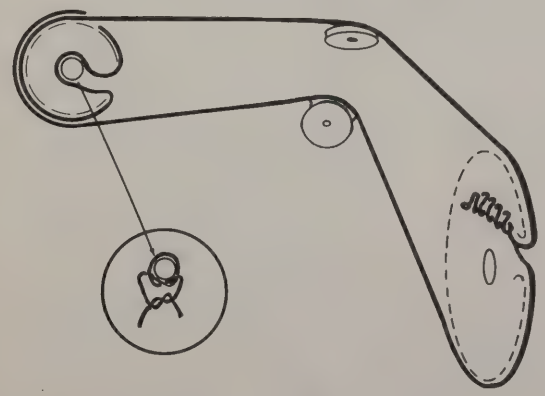
STAGE GAIN MEASUREMENTS			
CONVERTER GAIN	2X	IN	600KC
		OUT	455KC
1st INPUT IF TRANS.	13X		455KC
1st IF TUBE	140X		455KC
2nd IF TRANS.	.4X		455KC
2nd IF TUBES	250X		455KC
3rd IF TRANS.	.75X		455KC
AUDIO	250X		400 ∿
OUTPUT	20X		400 ∿
	RECORDER		
1st AUDIO	40X		400 ∿
2nd AUDIO	35X		400 ∿
OUTPUT	9X		400 ∿
RECORD IND. AMP.	4X		400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

TUNING GANG FULLY CLOSED



DIAL CORD DRIVE

DATE 3/48-#4911-20 SET #41-FOLDER #20

PUSH-BUTTON TUNING

The six push buttons are used for push-button station tuning and may be set for stations on the standard broadcast, shortwave or frequency modulation bands.

1. Select a push-button for the desired station to be tuned in. Depress the button and hold it down.
2. Turn the tuning knob approximately 1/2 turn in either direction. A series of clicks will be heard.
3. Pull the selected push-button up.
4. Tune in the desired station in the normal manner.
5. Push the selected button down firmly. This is the locking operation.
6. Set up the remaining push-buttons in the same manner.

Depress the push-button for the station you desire to tune in. The button will remain depressed until you push another button or tune another station manually.

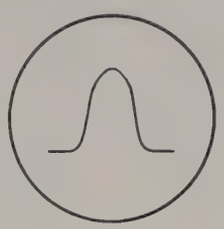


FIG. 1

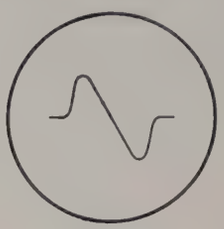


FIG. 2

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

No attempt should be made to align this receiver other than as outlined below.
To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.
To avoid undue oscillation, connections to receiver should be made as short as possible.

PRELIMINARY FM-IF ALIGNMENT

If a VTVM is not available a DC 20KΩ per volt DC voltmeter may be used as an output indicator.
To gain access to Pin 8 of 7F8, the tube must be removed and an insulated short lead looped around Pin 8. Reinsert tube in socket and use lead for connection. Care should be taken not to short Pin 8 to chassis or other pins.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) 7F8. Low side to chassis. (See prealignment notes).	10.7MC (unmodulated)	FM (fully counter clockwise)	Tuning cap. fully closed	DC probe to Point ⓐ. Common to chassis	A1,A2, A3,A4, A5,A6.	Adjust for maximum deflection. Attenuate output of signal generator to maintain maximum meter reading of 2 volts.

AM ALIGNMENT

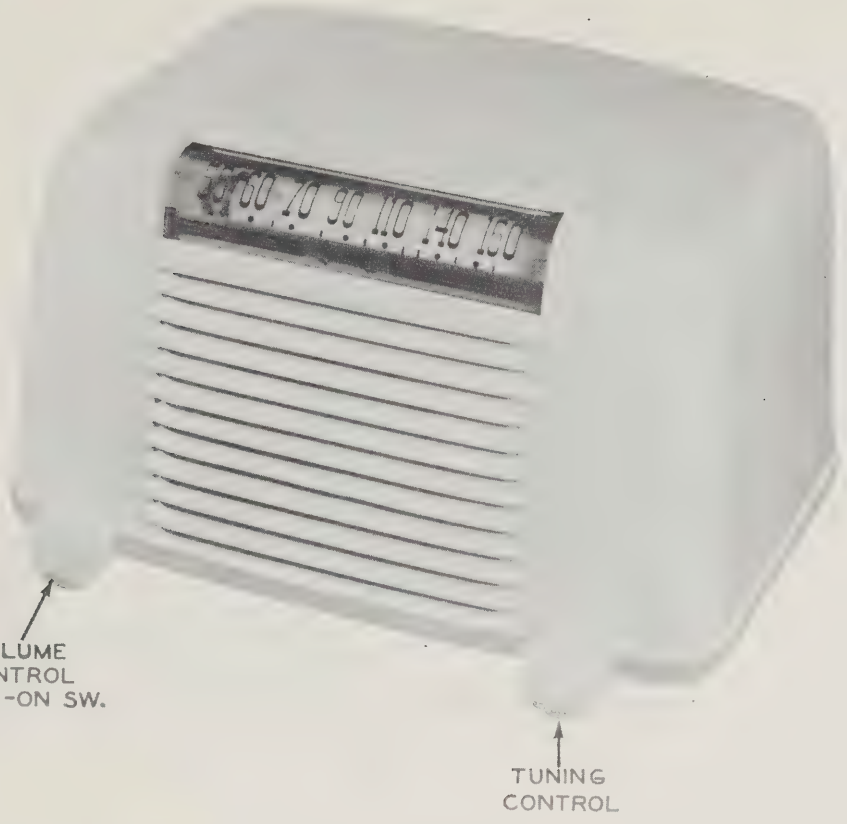
Loop must be connected for AM alignment.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
2	.1 MFD.	High side to Pin 4 7N7 BC Conv. Tube (3). Low side to chassis.	455KC (Amp. modulated)	BC (1 position clockwise)	Tuning cap. fully closed	Across voice coil	A7,A8, A9,A10, A11,A12	Adjust for maximum output.
3	200MMFD	High side to ext. ant. terminal. Low side to chassis.	1650KC	"	Tuning cap. fully open.	"	A13	" " " "
4	200MMFD	"	1400KC	"	Tune for maximum output.	"	A14,A15	" " " "
5	200MMFD	"	600KC	"	"	"	A16	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 & 5 until no further improvement can be made.
6	400Ω carbon res.	"	11.8MC	SW 1 (3 positions clockwise)	11.8MC	"	A17	Adjust for maximum output. Turn sig. gen. to 12.7MC If signal is not heard retune sig. gen. to 11.8 MC & open A17 to next peak. Adjust for maximum output and recheck image.
7	"	"	"	"	Tune for maximum output.	"	A18	Rock tuning cap. and adjust for maximum output.
8	"	"	15.2MC	SW 2 (4 positions clockwise)	15.2MC	"	A19	Adjust for maximum output. Check for image as in Step 6 tuning sig. gen. to 16.1MC.
9	"	"	"	"	Tune for maximum output.	"	A20	Rock tuning cap. and adjust for maximum output.

FINAL FM IF RF ALIGNMENT

Use freq. modulated signal 60 ∿ modulation and 300KC sweep. Connect 60 ∿ synchronizing voltage from signal generator to horizontal input of scope. If this synchronizing voltage is not available from signal generator it may be obtained from AC line. Some phase shift may be encountered resulting in a double trace pattern. If signal generator has phase control rotate it to obtain single trace pattern. If this control is not available or sync. voltage is being taken from AC line the same thing may be accomplished by inserting a capacitor of suitable value (.01 to .1 MFD) in series with sync. voltage to horizontal input to scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
10	400Ω carbon res.	High side to Pin 8 (grid) 7F8. Low side to chassis. (See prealignment notes).	10.7MC (freq. modulated)	FM	Tuning cap. fully closed	Connect 5KΩ resistor from Point ⓐ to chassis. Vertical input of scope in series with 100K Ω resistor to Point ⓐ. Grnd. to chassis	A1,A2, A3,A4, A5,A6	Use full gain of vertical amplifier of scope with minimum signal from sig. gen. Adjust A1,A2,A3,A4, A5 & A6 for maximum amplitude & symmetry of pattern with pattern centered on horizontal sweep line per Fig. 1. Remove 5KΩ resistor from Point ⓐ.
11	"	"	"	"	"	Vertical input in series with 100K Ω resistor to Point ⓐ. Ground to chassis.	A21	Adjust for maximum vertical amplitude of pattern per Fig. 2.
12	"	"	"	"	"	"	A22, A23	Alternately adjust A22 & A23 for maximum straightness of diagonal line with peaks occurring at least 75KC either side of center of diagonal line, with center of diagonal line on the horizontal sweep line. Repeat Steps 11 & 12.
13	2 120Ω carbon res.	Each side in series with 120Ω to FM pins of ant. socket.	108MC	"	108MC	Connect 5KΩ resistor from Point ⓐ to chassis. Vertical input of scope in series with 100K Ω resistor to Point ⓐ. Ground to chassis	A24	Adjust for pattern of Fig. 1 centered on horizontal sweep line.
14	"	"	"	"	Tune for pattern of Fig. 1 centered on horizontal sweep line.	"	A25,A26 A27.	Adjust for maximum amplitude of pattern of Fig. 1. Remove 5KΩ resistor from Point ⓐ.



SONORA MODEL
100

SONORA MODEL
100

SONORA MODEL 100

TRADE NAME	Sonora, Model 100
MANUFACTURER	Sonora Radio & Tele. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	535-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output	"	A6	Adjust for maximum output.

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DATE 5/48-#4311-21 SET #41-FOLDER #21

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	35L6GT	35L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SONORA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150		PRSA150/40-40	EDL4415	DSB-2x40-150	TA-440	Filter-Blue
B	40	150						" -Red
6A	35	150	N-6631	PRSA150/40-40	EDL4415			Alternate Filter
B	30	150						" "
7	.05	400	N-1346	484-05	DT4S5	ST-4-05	TC-15	Rectifier Bypass
8	.02	400	N-1376	484-02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
9	.005	600	N-4894	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
10	.05	200	N-1345	484-05	DT2S5	ST-4-05	72P1	Line Isolation
11	.05	200	N-1345	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
12A	.01	400	N-6477	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling-See Note
B	500	600	N-4890	1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass- " "
13	100	500	N-1374	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
14	10	00	N-1681	1469-00001	5R5Q1	MOS.5-41	MS-41	Fixed Trimmer

Note-In some receivers Items 12A, 12B,20 & 21 are part of audio coupling plate and obtained under Part No. N-6477.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
15A	500KΩ	½	N-4999	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

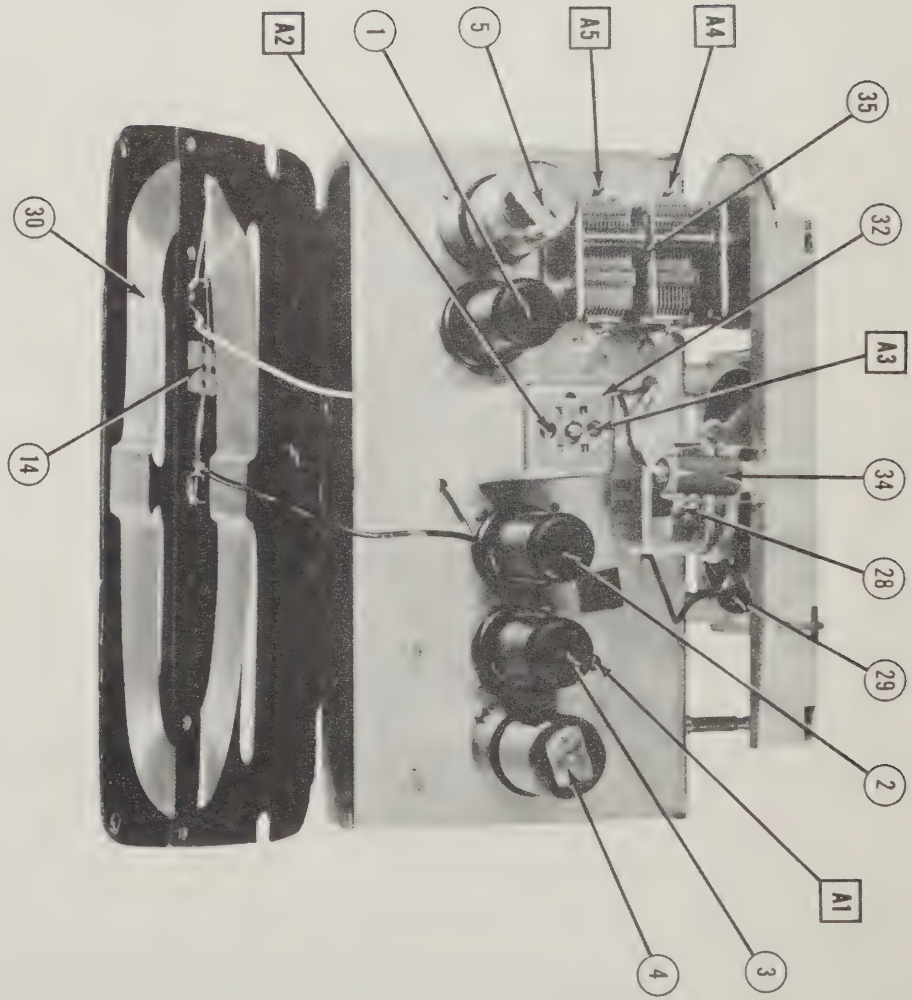
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SONORA PART No.	IRC PART No.	IDENTIFICATION CODES
16	22KΩ	½	N-4025	BTS-22K	Red-Red-Or. Oscillator Grid
17	1 Meg.	½	N-1262	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
18	47KΩ	½	N-4063	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
19	6.8 Meg.	½	N-4028	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
20	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. AF Plate Load-See Note 1
21	470KΩ	½	N-4027	BTS-470K	Yl.-Vi.-Yl. Output Grid-See Note 1
22	220Ω	½	N-4024	BW-½-220	Red-Red-Br. Output Cathode
23	1000Ω	1	N-5358	BTA-1000	Br.-Blk.-Red Filter
24	33Ω	½	N-4022	BW-½-33	Or.-Or.-Blk. Surge Limiter
25	82Ω	2	N-4023	BW-2-82	Gray-Red-Blk. Line Dropping-See Note 2
26	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. Line Isolation

Note 1-In some models Items 12A, 12B, 20 and 21 are replaced with audio coupling plate #N-6477.
Note 2-In some models this item is replaced with 2-150Ω 1 W. resistors in parallel.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SONORA PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
27	3000Ω	2.9Ω	300Ω	.6Ω	N-3899	A-3876*	T22S45*	A-2998	*Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA SONORA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113		
28	PM	2.9Ω	N-4318	Mod. P4-X	4A15	
	CONE DIA.	VC DIA.				
28	3-15/16"	1/2"				

R F COILS

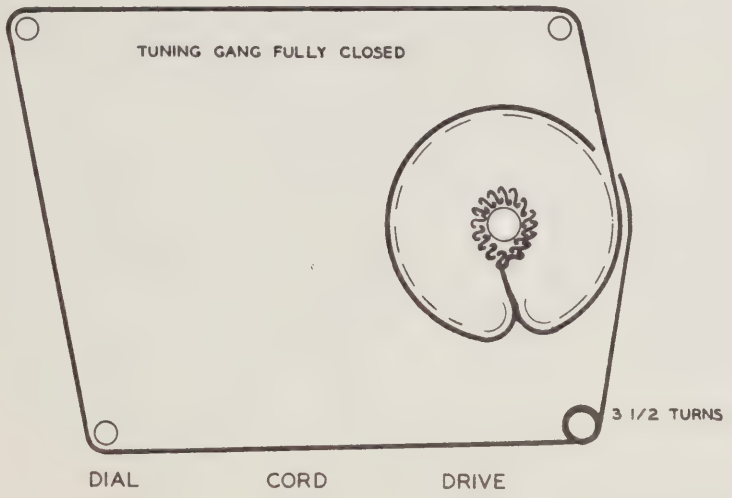
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA SONORA PART No.	REPLACEMENT DATA MEISSNER PART No.	
30A	Loop Ant.		1.3Ω	N-6812		Alternate used with tuning gang #N-593
B	" "			N-6629		
31	Osc. Coil	.8Ω	6.1Ω	N-4810	14-1060	
32	Input IF	21Ω	20Ω	N-4813	16-6658	
33	Output IF	29Ω	29Ω	N-4846		

DIAL LIGHT

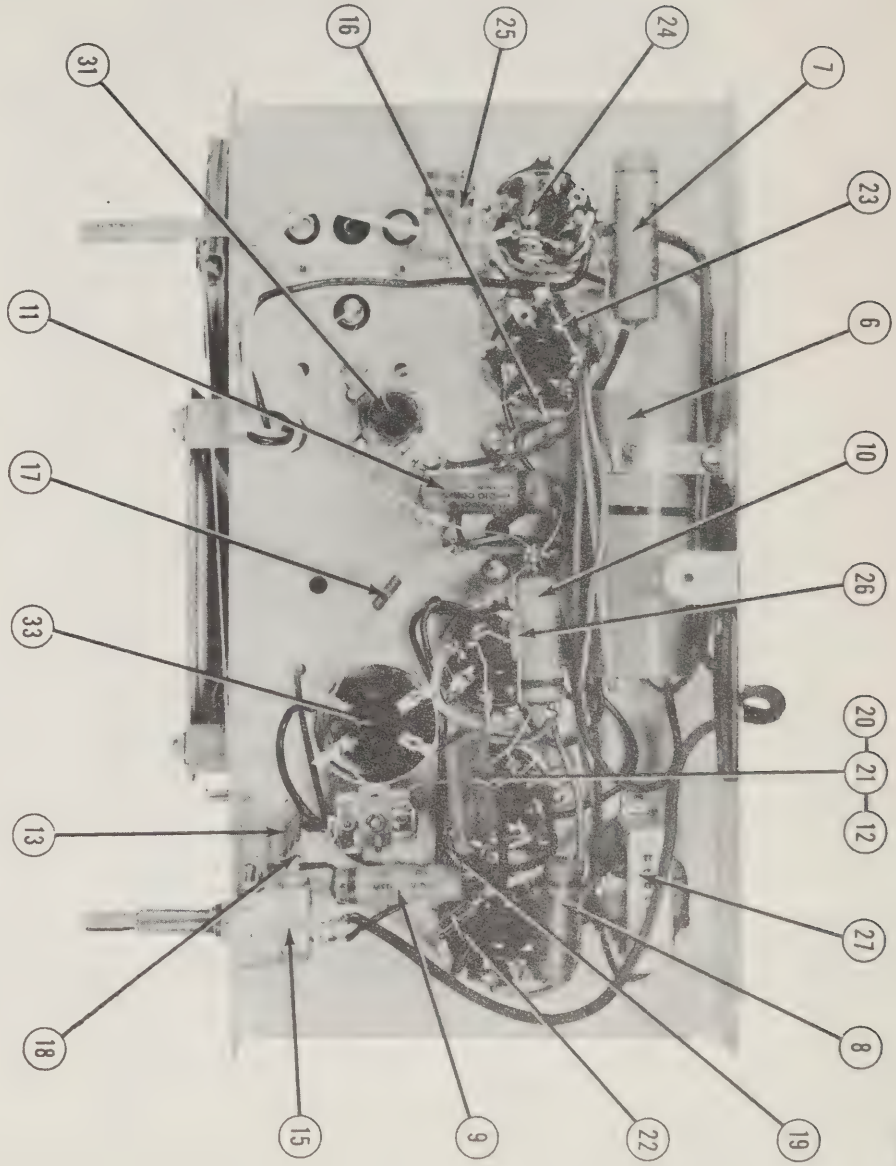
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA SONORA PART No.		INSTALLATION NOTES
34	Bayonet	6-8	0.15	Brown	#47		Type 47

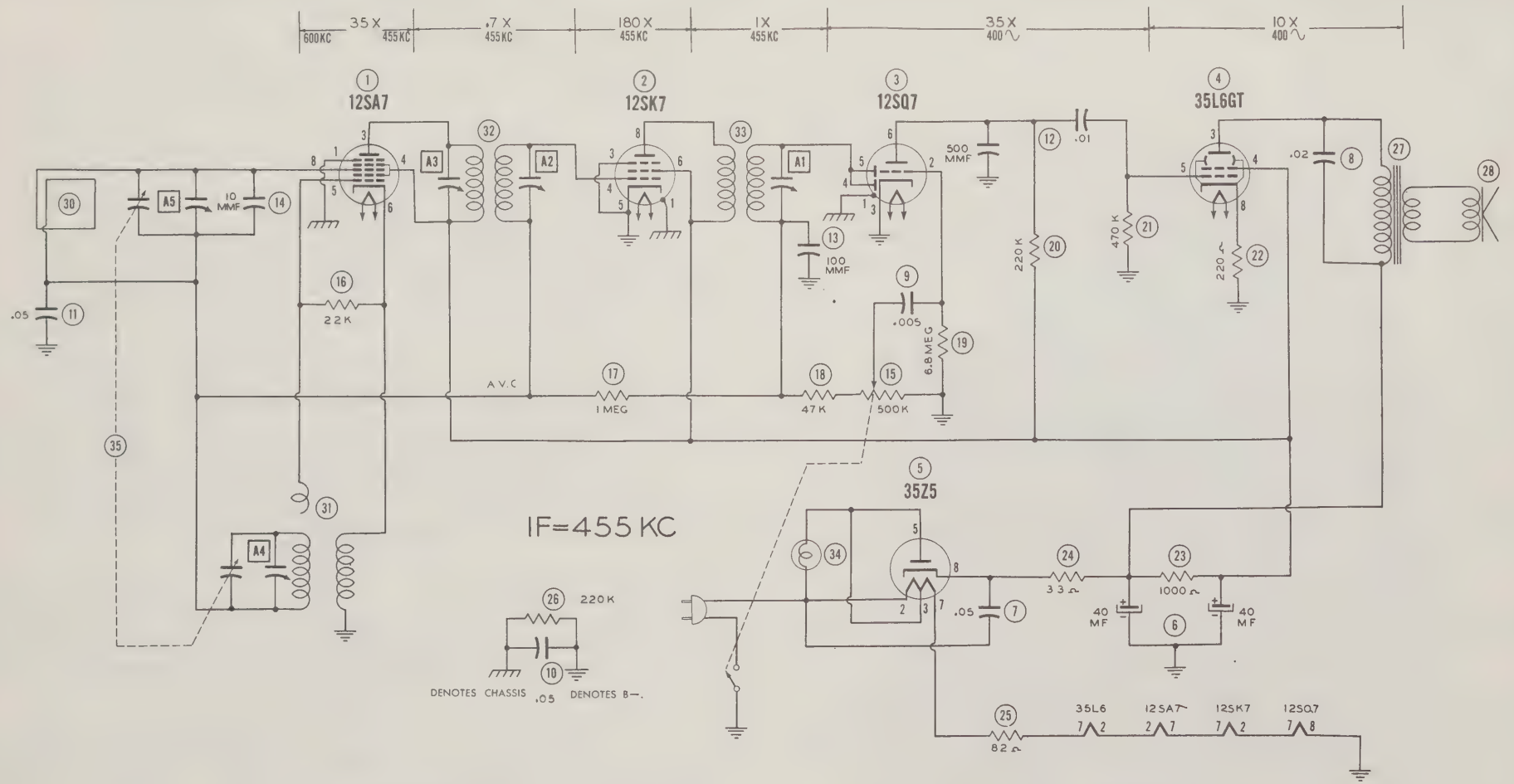
MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
35A	2 Gang Var. Cap.	N-5286	(27-468MMF, 33-197MMF)
B	" " " "	N-5936	Alternate
A1	Trimmer	N-4048	Output IF Adj.



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	32VAC	87VDC	87VDC	-18VDC§	0V.	26VAC	-.3VDC
2	12SK7	0V.	13VAC	0V.	-.3VDC	0V.	87VDC	26VAC	87VDC
3	12SQ7	0V.	-.7VDC	0V.	-.6VDC	-.6VDC	52VDC	13VAC	0V.
4	35L6GT	0V.	36VAC	108VDC	87VDC	0V.	0V.	75VAC	5.9VDC
5	35Z5GT	0V.	117VAC	112VAC	116VDC	112VAC	75VAC	85VAC	116VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	38Ω	35KΩ	35KΩ	22KΩ	.8Ω	26Ω	1.5 Meg.
2	12SK7	220KΩ	12Ω	0Ω	1.5 Meg.	0Ω	35KΩ	20Ω	35KΩ
3	12SQ7	220KΩ	6.8 Meg.	0Ω	550KΩ	550KΩ	550KΩ	1Ω	0Ω
4	35L6GT	INF.	38Ω	35KΩ	35KΩ	470KΩ	0Ω	72Ω	220Ω
5	35Z5GT	INF.	170Ω	167Ω	.35KΩ	167Ω	72Ω	140Ω	35KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4811-21

The stage gain measured valucs listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

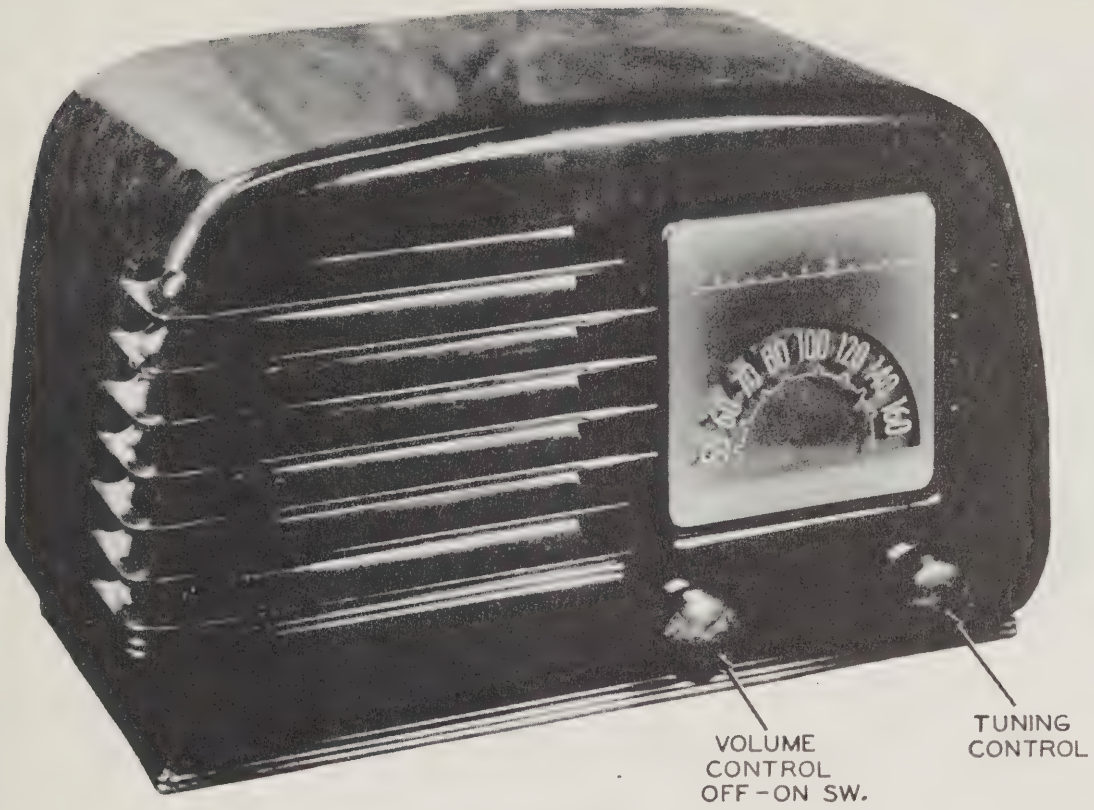
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

STEWART-WARNER MODELS C51T1 (Code #9054-A), C51T2 (Code #9054-B)

STEWART-WARNER MODELS C51T1 (Code #9054-A), C51T2 (Code #9054-B)



STEWART-WARNER MODELS C51T1 (Code #9054-A), C51T2 (Code #9054-B)

STEWART-WARNER MODEL C51T2

TRADE NAME	Stewart-Warner, Models C51T1 (Code #9054-A), C51T2 (Code #9054-B)
MANUFACTURER	Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1670KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set dial pointer horizontally to the left. Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output in order given and then repeat adjustments.
2		"	1400KC	1400KC with receiver in cabinet.	"	A5	Place chassis in cabinet, turn dial to 1400KC calibration mark and remove from cabinet. Adjust A5 for maximum output. The trimmer opposite A5 is a factory adjustment and ordinarily need not be adjusted.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

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DATE 5/48-#4811-22 SET #41-FOLDER #22

PARTS LIST AND DESCRIPTIONS

STEWART-WARNER MODELS C51T1, C51T2

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STEWART-WARNER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	30	150	506090	PRSA150/20-30	EZ3315	DSB-2x30-150	TA-230	Filter-Red
B	20	150						" -Blue
7	.05	600	502154	684-05	DT6S5	ST-6-05	TC-15	Line Filter
8	.01	400	504726	484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
9	.01	400	504726	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
10	.05	200	502153	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
11	.15	400	502158	484-.15	DT4P2	ST-4-2	72P3	Line Isolation
12A	5000	450	*	1467-005	1W5D5	MW.5-25	1FM-25	Audio Coupling
B	250	450	*	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
13	100	500	502931	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
14	100	500	502931	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.

*Items 12A, 12B, 20A & 20B are part of resistor, capacitor combination and obtained under Part number 505858.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STEWART-WARNER PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
15A	1 Meg.	½	506087	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 15A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

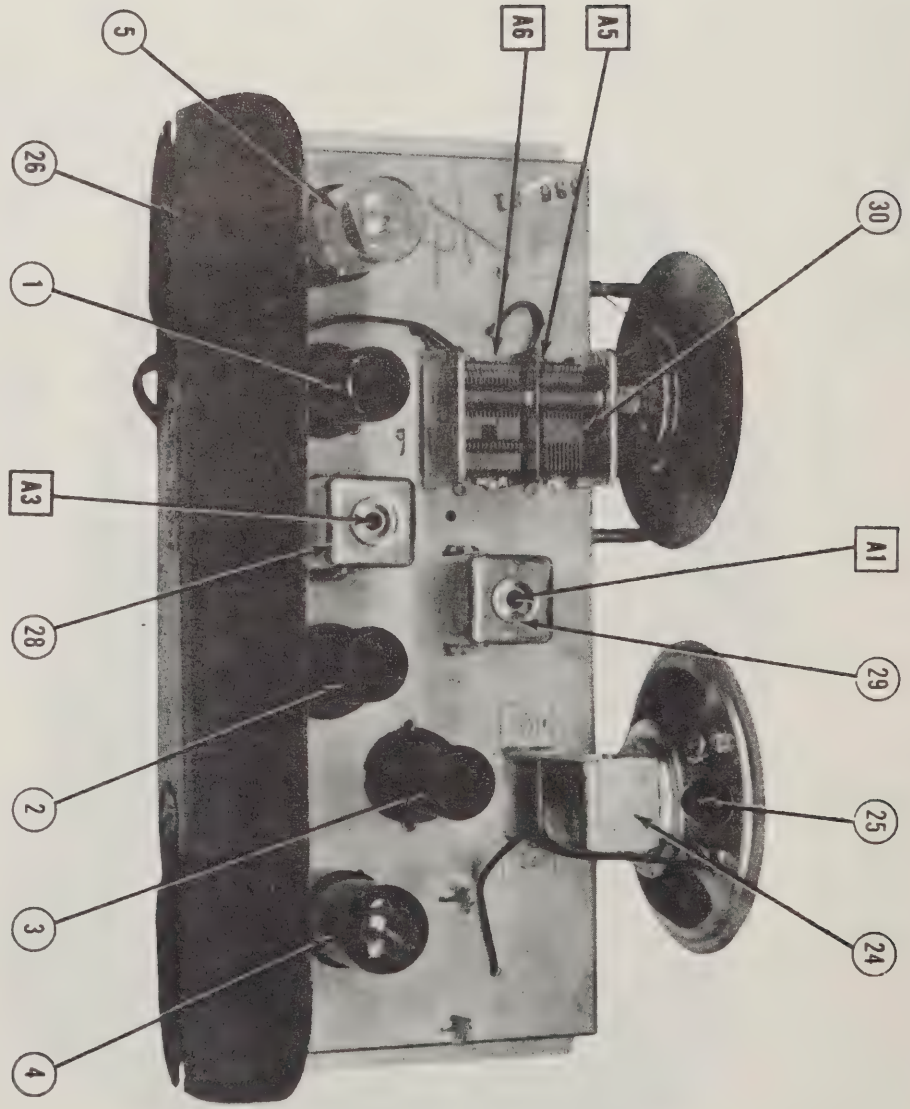
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STEWART-WARNER PART No.	IRC PART No.	IDENTIFICATION CODES
16	22KΩ	½	510061	BTS-22K	Red-Red-Or. Oscillator Grid
17	3.3 Meg.	½	510094	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
18	150Ω	½	510022	BW-½-150	Br.-Grn.-Br. IF Cathode
19	10 Meg.	½	510097	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
20A	470KΩ	1/5	*	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
B	470KΩ	1/5	*	BTS-470K	Yl.-Vi.-Yl. AF Grid
21	330Ω	½	510128	BW-½-330	Or.-Or.-Br. Output Cathode
22	2200Ω	1	510243	BTA-2200	Red-Red-Red Filter

*Items 12A, 12B, 20A & 20B are part of resistor capacitor combination and obtained under Part #505858.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: STEWART-WARNER PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
23	2500Ω	3.2Ω	270Ω	.6Ω	506089	A-3876‡	T22845‡	A-2928‡	‡Cut mounting tabs to duplicate original mounting.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

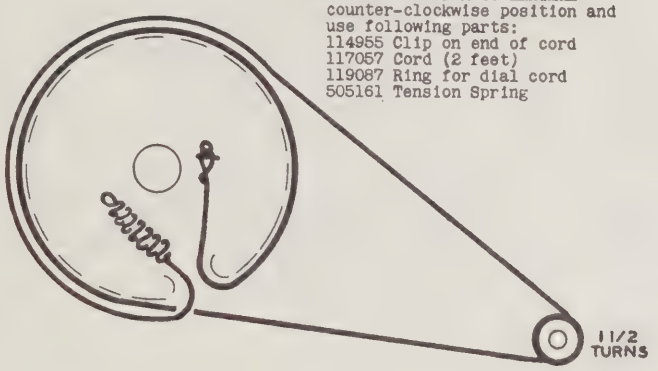
ITEM No.	RATINGS		REPLACEMENT DATA: STEWART-WARNER PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
24	FIELD	VC IMP.	506079	ST-113†	4A15†	†Fabricate new mounting bracket.
	PM	3.2Ω		Mod. P4-X		
	CONE DIA.	VC DIA.				
25	4"	1/2"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: STEWART-WARNER PART No.	MEISSNER PART No.
26	Loop Ant.		3.2Ω	506088	
27	Osc. Coil	.3Ω	3.2Ω	506094	14-1060
28	Input IF	18Ω	18Ω	506083	16-5740
29	Output IF	18Ω	18Ω	506084	16-5742

MISCELLANEOUS

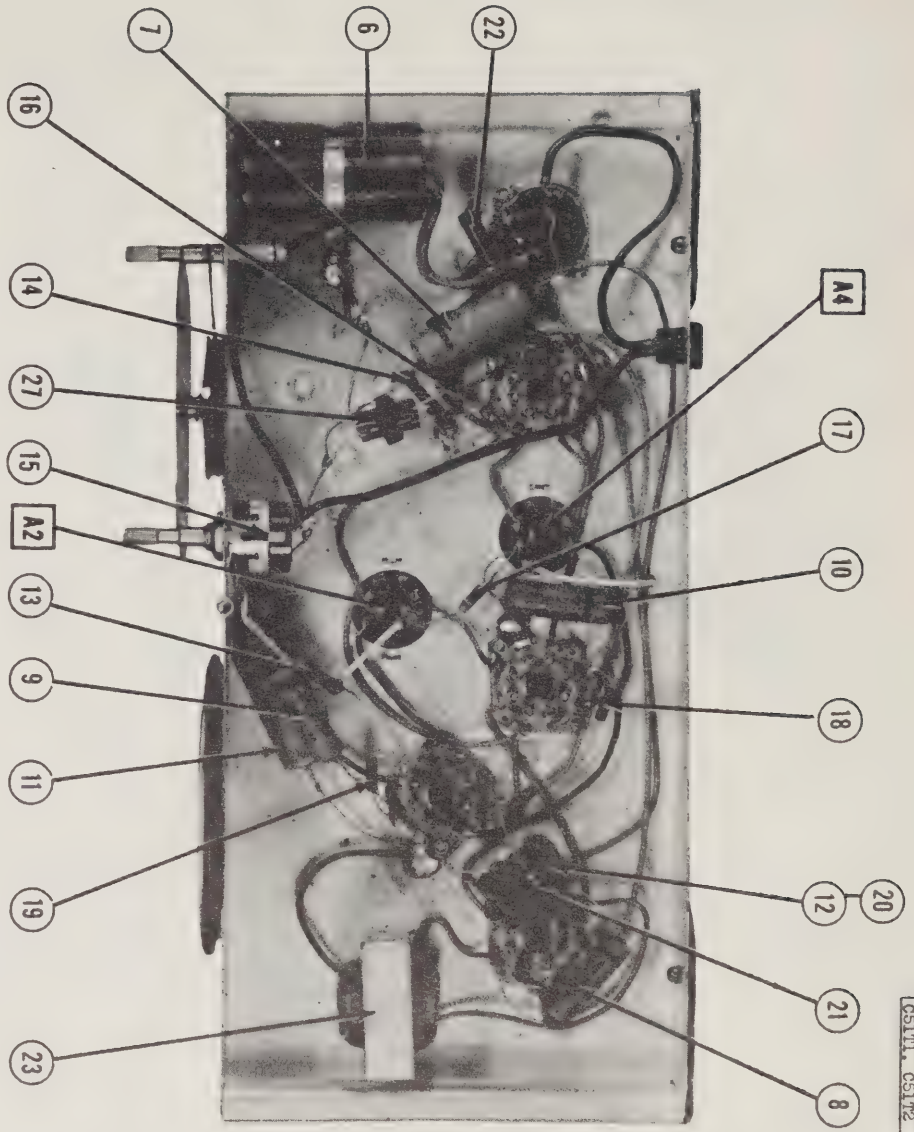
ITEM No.	PART NAME	STEWART-WARNER PART No.	NOTES
30	2 Gang Var. Cap.	506081	(22-470MMF, 22-190MMF)
	Dial Scale	506095	
	Dial Pointer	506082	Disc.
	Knob	502564	Model C51T1
	"	502563	" C51T2
	Cabinet	505901	Ivory Model C51T1
	"	505902	Mahogany Model C51T2



DIAL CORD DRIVE

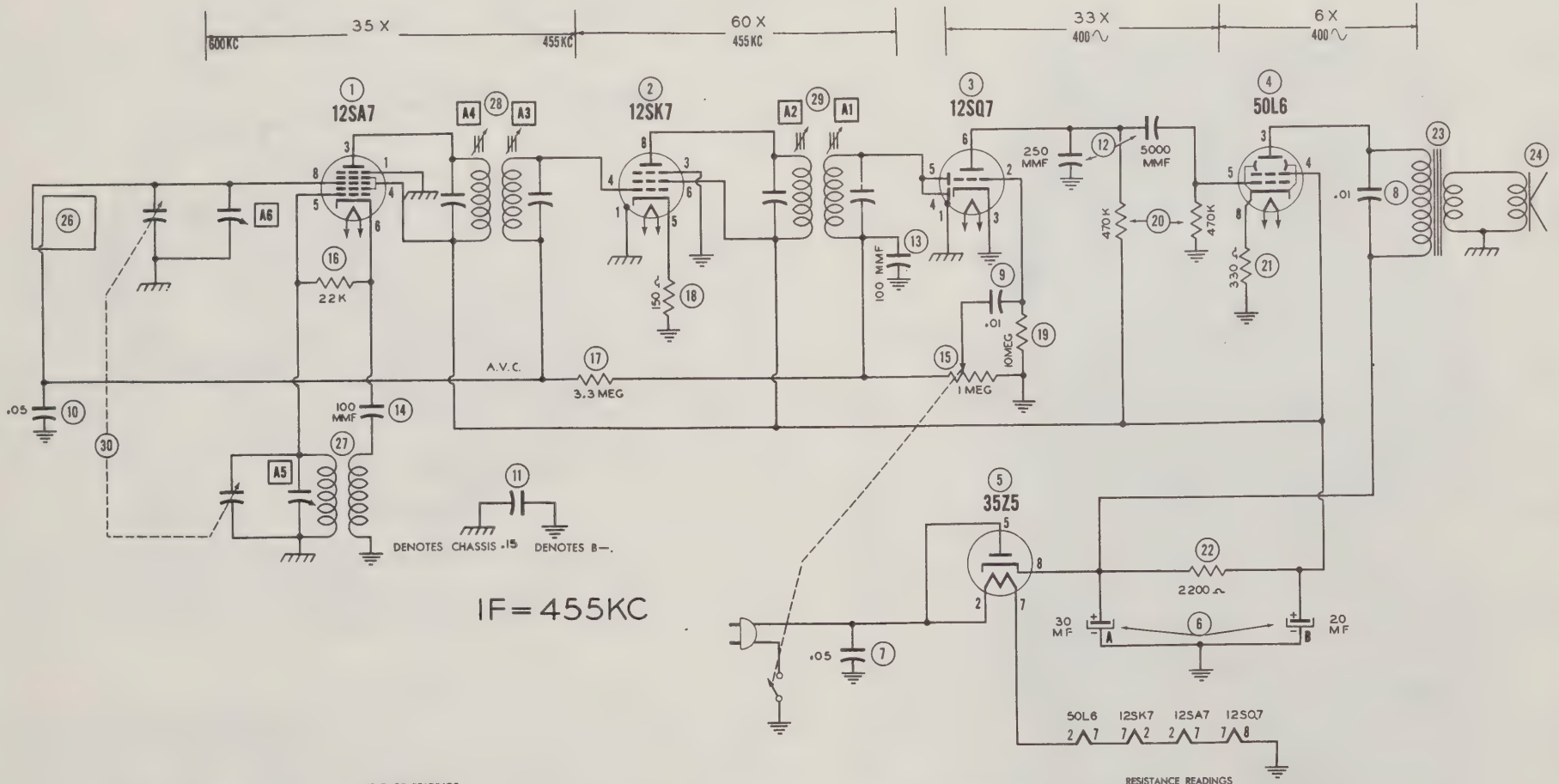
To string dial cord, turn the main drive drum to maximum counter-clockwise position and use following parts:
114955 Clip on end of cord
117057 Cord (2 feet)
119087 Ring for dial cord
505161 Tension Spring

CHASSIS—BOTTOM VIEW



STEWART-WARNER MODELS C51T1, C51T2

STEWART-WARNER MODELS C51T1, C51T2



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	24VAC	90VDC	90VDC	-7.4VDC§	0V.	12VAC	-.4VDC
2	12SK7	0V.	24VAC	0V.	-.4VDC	1.7VDC	90VDC	36VAC	90VDC
3	12SQ7	0V.	-.7VDC	0V.	-.4VDC	-.4VDC	55VDC	12VAC	0V.
4	50L6GT	0V.	83VAC	135VDC	90VDC	0V.	140VDC	36VAC	7.8VDC
5	35Z5GT	0V.	117VAC	112VAC	0V.	117VAC	90VDC	83VAC	140VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	INF.	26Ω	250KΩ	250KΩ	22KΩ	.3Ω	13Ω	4.3 Meg.
2	12SK7	INF.	26Ω	0Ω	4.3 Meg.	150Ω	250KΩ	38Ω	250KΩ
3	12SQ7	INF.	10 Meg.	0Ω	1 Meg.	1 Meg.	720KΩ	13Ω	0Ω
4	50L6GT	INF.	90Ω	250KΩ	250KΩ	470KΩ	250KΩ	38Ω	330Ω
5	35Z5GT	INF.	20Ω	115Ω	INF.	120Ω	250KΩ	90Ω	250KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4811-22

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STROMBERG-CARLSON MODEL 1101HPW

STROMBERG-CARLSON MODEL 1101HPW

STROMBERG-CARLSON MODEL 1101HPW

TRADE NAME	Stromberg-Carlson, Model 1101HPW
MANUFACTURER	Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N.Y.
TYPE SET	AC Operated Radio Phono Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SK7 RF Amp., 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		Loop	1580KC	Tuning cap. fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1400KC	Tune for maximum output.	"	-	Set pointer to center of 1400KC calibration mark.
4		"	"	1400KC	"	A5,A6, A7	Adjust for maximum output.
5		"	600KC	Tune for maximum output.	"	-	Check calibration. If off repeat Step 4 until no further improvement can be made.

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DATE 5/48-#4811-23 SET #41-FOLDER #23

PARTS LIST AND DESCRIPTIONS

STROMBERG-CARLSON
MODEL 1101HPW

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12SK7	12SK7	8N	
2	Conv.	12SA7	12SA7	8R	
3	IF Amp.,	12SK7	12SK7	8N	
4	Det.-AVC-AF	12SQ7	12SQ7	8Q	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	111001	AF88D	UP4415	DY-2x40-150	EL-240	▲ Filter
B	40	150						■ "
8	.05	400	40632	484-05	DT4S5	ST-4-05	TC-15	Line Filter
9	.002	600	27646	684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass‡
10	.01	600	25485	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
11	.005	600		684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
12	.01	600	25485	684-01	DT6S1	ST-6-01	TC-11	Phono Isolation
13	.01	600	25485	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
14	.1	400		484-1	DT4P1	ST-4-1	TC-1	IF Screen Bypass
15	.05	400	40632	484-05	DT4S5	ST-4-05	TC-15	Output Bias Filter
16	.05	400	40632	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
17	.05	400	40632	484-05	DT4S5	ST-4-05	72P1	Line Isolation
18	47	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Feedback-Cer.
19	100	500	24559	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
20	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Phono Tone Comp.
21	390	500		1468-0004	5W5T4	MO.5-34	1FM-34	" " "
49	5	300		1468-000005	5W5V5	MO.5-55	MS-55	Ext. Ant. Coupling-Cer

‡Not used in some models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
22A	1 Meg.	½	145001	D13-137	M-63-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 22A per instructions
C	Switch		" "	41	SW-A	" " " " " "

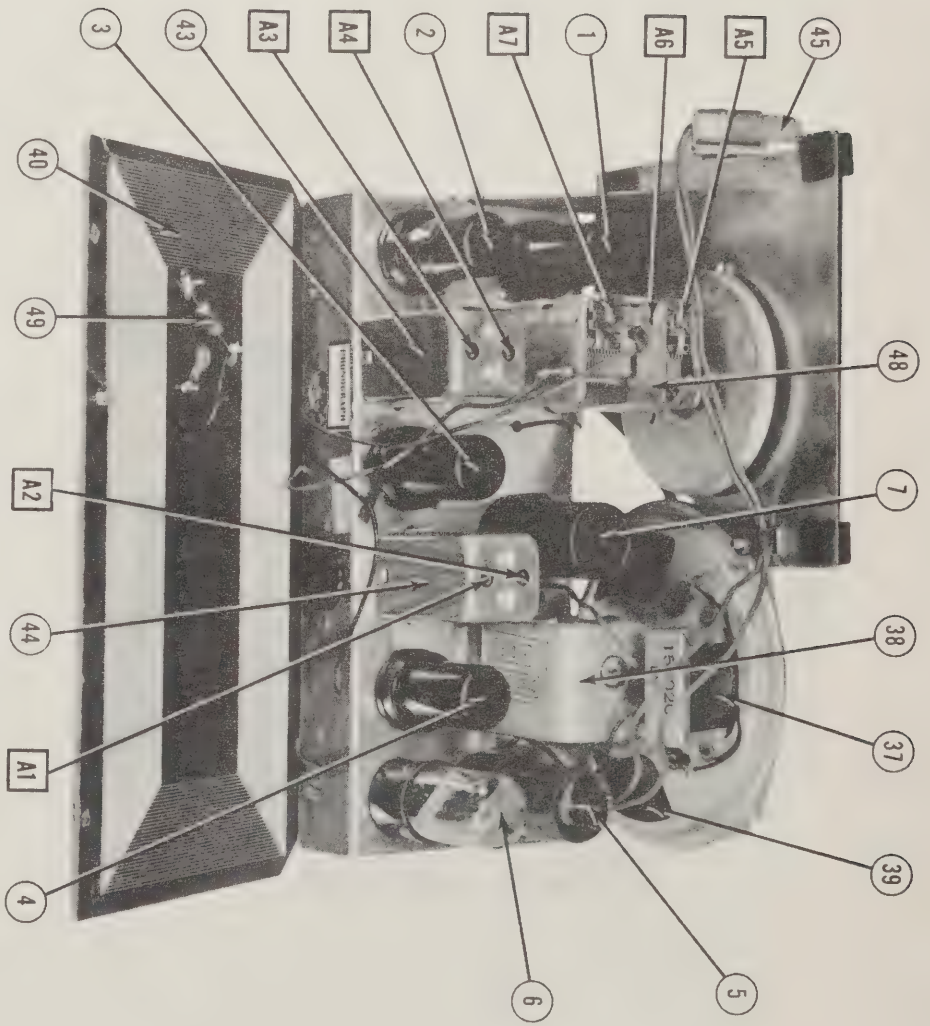
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STROMBERG-CARLSON PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
23	10 Meg.	½	26381	BTS-10 Meg.	Br.-Blk.-Blue AVC Network
24	22KΩ	½	26349	BTS-22K	Red-Red-Or. Osc. Grid
25	100KΩ	½	26357	BTS-100K	Br.-Blk.-Yl. Bias
26	2.2 Meg.	½	26373	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
27	10 Meg.	½	26381	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
28	390KΩ	½	36364	BTS-390K	Or.-White-Yl. AF Plate Load
29	150Ω	½		BW-½-150	Br.-Grn.-Br. Parasitic Supp.
30	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Feedback
31	560KΩ	½	26366	BTS-560K	Grn.-Blue-Yl. Output Grid
32	2.7 Meg.	½	28196	BTS-2.7 Meg.	Red-Vi.-Grn. " "
33	270KΩ	½		BTS-270K	Red-Vi.-Yl. Phono Tone Comp.
34	270KΩ	½	26362	BTS-270K	Red-Vi.-Yl. Line Isolation
35	15Ω	½	26311	BW-2-15	Br.-Grn.-Blk. Surge Limiter

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (@ CURRENT 1000∿)	REPLACEMENT DATA: STROMBERG-CARLSON PART NO.	REPLACEMENT DATA: STANCOR PART NO.	REPLACEMENT DATA: THORDARSON PART NO.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
36	.060	320Ω	54 Henries	161004	C-1706	T20C52	C-2975	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		STROMBERG-CARLSON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
37	2180Ω	3.5Ω	223Ω	.9Ω	155020	A-3876	T22S45	A-2928	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA				INSTALLATION NOTES
			STROMBERG-CARLSON PART No.	JENSEN PART No.	QUAM PART No.		
	FIELD	VC IMP.		ST-106			
38	PM	3.5Ω	155013	Mod. P5-W			
	CONE DIA.	VC DIA.					
39	5-1/8"	9/16"					

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	STROMBERG-CARLSON PART No.	MEISSNER PART No.	
40	Loop Ant.		1.3Ω	139005		
41	RF Coil	90Ω	6Ω	114001		
42	Osc. Coil	.5Ω	10Ω	114002	14-1060	
43	Input IF	13Ω	13Ω	114301	16-6658	
44	Output IF	13Ω		114302	16-6670	

DIAL LIGHT

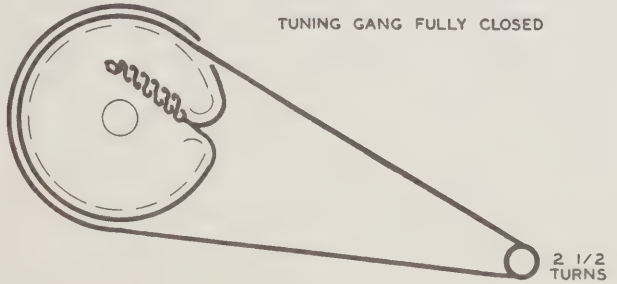
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					STROMBERG-CARLSON PART No.		
45	Bayonet	6-8	0.15	Brown	30933		Type 47

PHONO CARTRIDGE

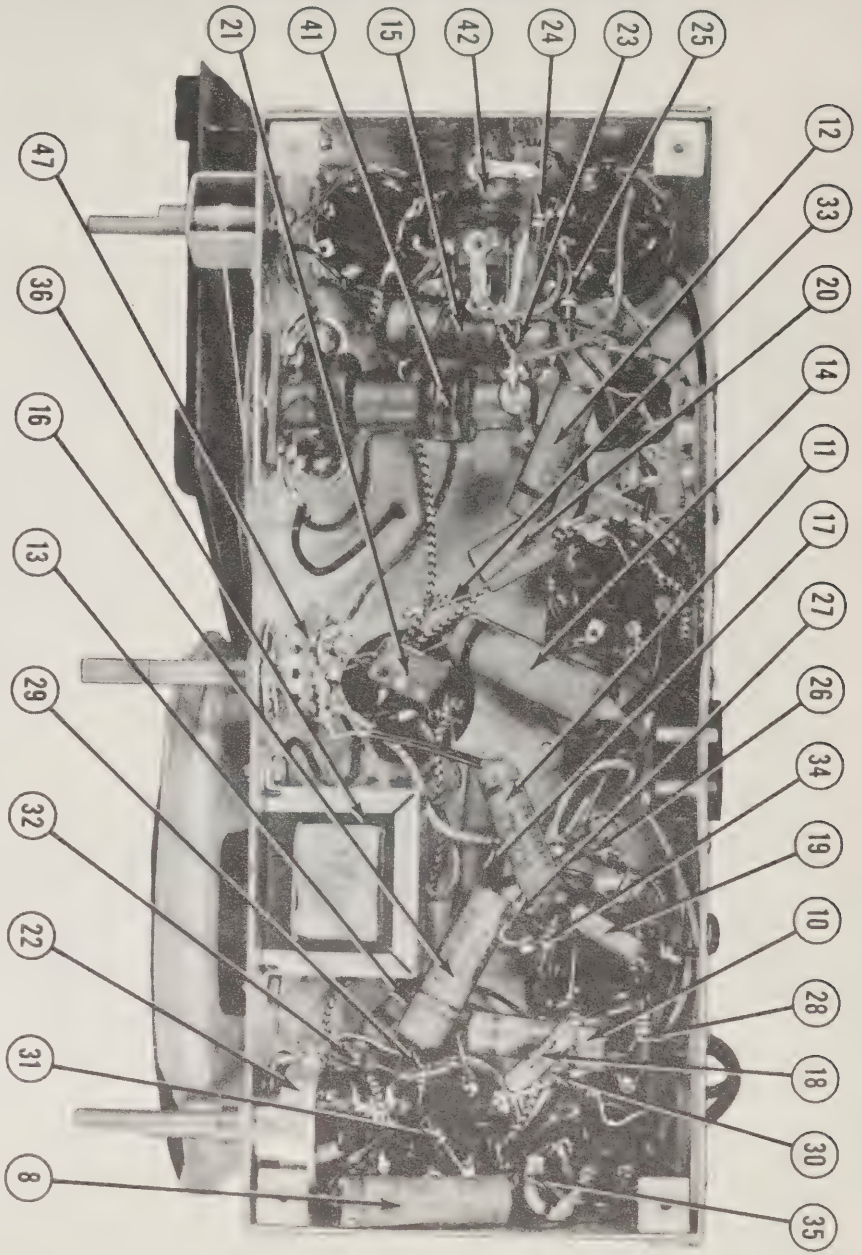
ITEM No.	REPLACEMENT DATA		REMARKS
	STROMBERG. PART No.	ASTATIC PART No.	
46		L-70-A	L-70 Original Part

MISCELLANEOUS

ITEM No.	PART NAME	STROMBERG-CARLSON PART No.	NOTES
47	Switch		Radio-Phono
48	3 Gang Var. Cap.	110001	(29-502MMF, 17-213MMF, 13-27MMF



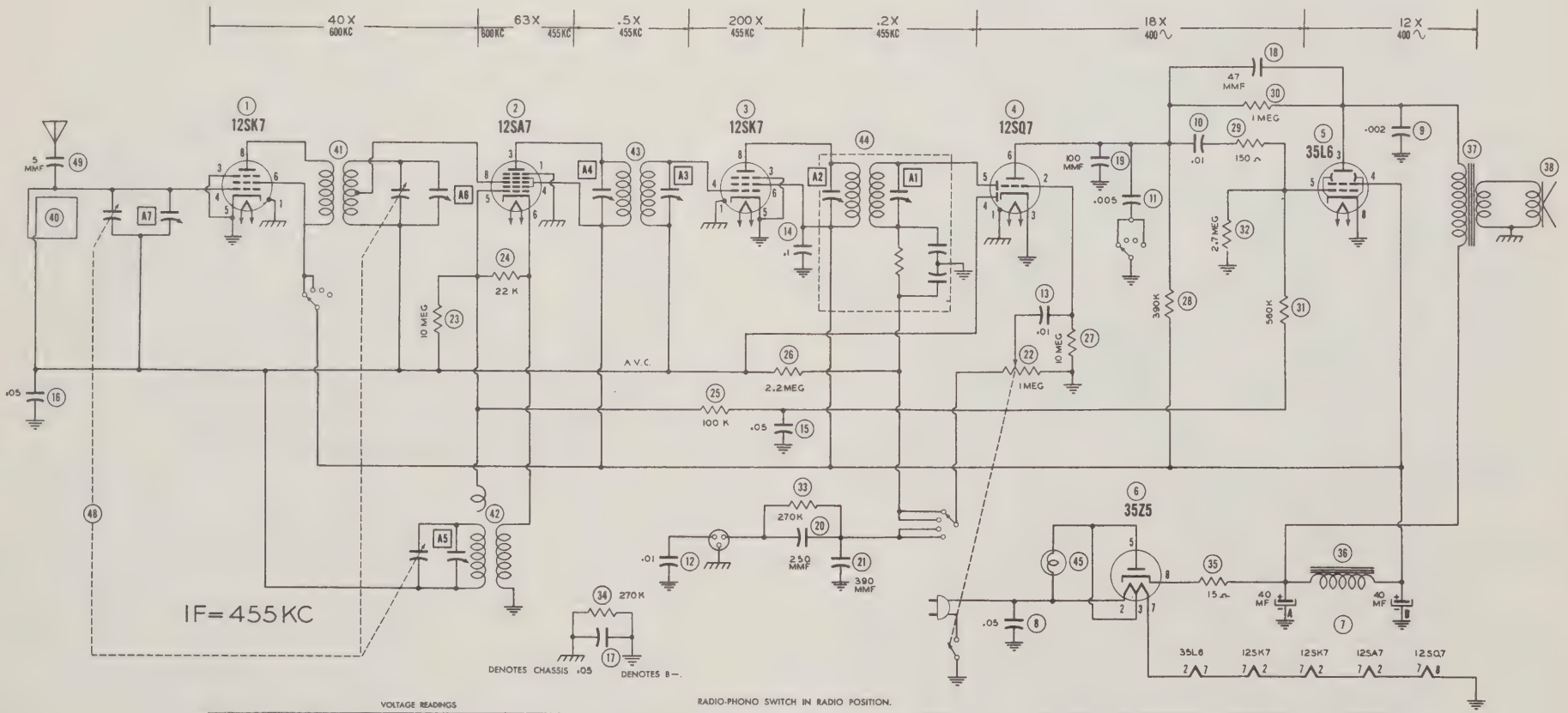
CHASSIS—BOTTOM VIEW



DATE 5/48-#4811-23 SET #41-FOLDER #23

STROMBERG-CARLSON MODEL 1101HPW

STROMBERG-CARLSON MODEL 1101HPW



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	0V.	24VAC	0V.	-.5VDC	0V.	93VDC	36VAC	93VDC
2	12SA7	0V.	12VAC	93VDC	93VDC	-9.6VDC	0V.	24VAC	-.5VDC
3	12SK7	0V.	36VAC	0V.	-.5VDC	0V.	93VDC	50VAC	93VDC
4	12SQ7	0V.	-.6VDC	0V.	-.6VDC	-.4VDC	61VDC	12VAC	0V.
5	35L6GT	-5.6VDC	87VDC	50VDC	93VDC	-1.4VDC	-1.4VDC	50VAC	0V.
6	35Z5GT	115VDC	117VAC	112VAC	93VDC	112VAC	0V.	87VAC	116VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RADIO-PHONO SWITCH IN RADIO POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	270KΩ	26Ω	0Ω	2.5 Meg.	0Ω	70KΩ	40Ω	70KΩ
2	12SA7	270KΩ	13Ω	70KΩ	70KΩ	22KΩ	15Ω	26Ω	2.5 Meg.
3	12SK7	270KΩ	40Ω	0Ω	2.5 Meg.	0Ω	70KΩ	54Ω	70KΩ
4	12SQ7	270KΩ	10 Meg.	0Ω	2.5 Meg.	600KΩ	460KΩ	13Ω	0Ω
5	35L6GT	120KΩ	100Ω	70KΩ	70KΩ	560KΩ	560KΩ	54Ω	0Ω
6	35Z5GT	70KΩ	138Ω	130Ω	70KΩ	130Ω	INF.	100Ω	70KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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4811-23

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ZENITH MODEL 14H789

TRADE NAME	Zenith, Model 14H789 (Ch. 13D22)		
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago, Ill.		
TYPE SET	AC Operated Combination Phono-Radio 2 Band AM 2 Band FM Superheterodyne Receiver		
TUBES (FOURTEEN)	Types, 6BA6 RF Amp., 6SB7Y Converter, 6SG7 1st IF Amp., 7W7 2nd IF Amp., 6SH7 Limiter, 6S8GT Discrim.-Det.-AVC-AF, 6AL7GT Tuning Eye, 7F7 Phono Osc. Amp., 6J5 Inverter, (4) 6V6GT Power Output, 5U4G Rectifier.		
POWER SUPPLY	110-120 Volts AC	RATING	1.5 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1620KC	SHORT WAVE FREQ. MOD.	9-12MC (1) 42-49MC (2) 88-108MC

PUSHBUTTON ADJUSTMENTS

Each button and its associated tuning adjustments will tune over a portion of the broadcast band, any station within its tuning range may be selected for automatic tuning on that button.

The tuning ranges are as follows:

B1, B2	-	540 to 940KC
B3, B4	-	600 to 1050KC
B5, B6	-	660 to 1150KC
B7, B8	-	740 to 1300KC
B9, B10	-	880 to 1600KC

1. Turn receiver on and allow to warm up for at least 15 minutes.
2. Make up a list of stations desired to be set up ranging from low freq. to high freq. making sure that each station falls within the range of its button.
3. Remove the automatic cover plate by pulling up on latch pin and lifting the plate away from the escutcheon.
4. Select a station within the range of B1 & B2.
5. Turn the band switch to BC and tune in the selected station on the dial- then turn the bandswitch to automatic position.
6. Press the lever associated with B1, B2 and tune in the same station by adjusting B1, B2 with the special wrench furnished with the receiver. First adjust the screw (B1) and then the hexagonal nut (B2) to the setting which gives the loudest and clearest signal of the desired station. This will be indicated when the tuning indicator is at its narrowest position. Repeat the operation for greatest accuracy.
7. Repeat the above procedure for the remaining buttons to be set up.
8. Remove the call letters of the stations selected from the call letter sheets furnished with the receiver. Press the top buttons in and slide the call letter tabs into the slots on the pushbuttons. Replace the automatic cover plate.

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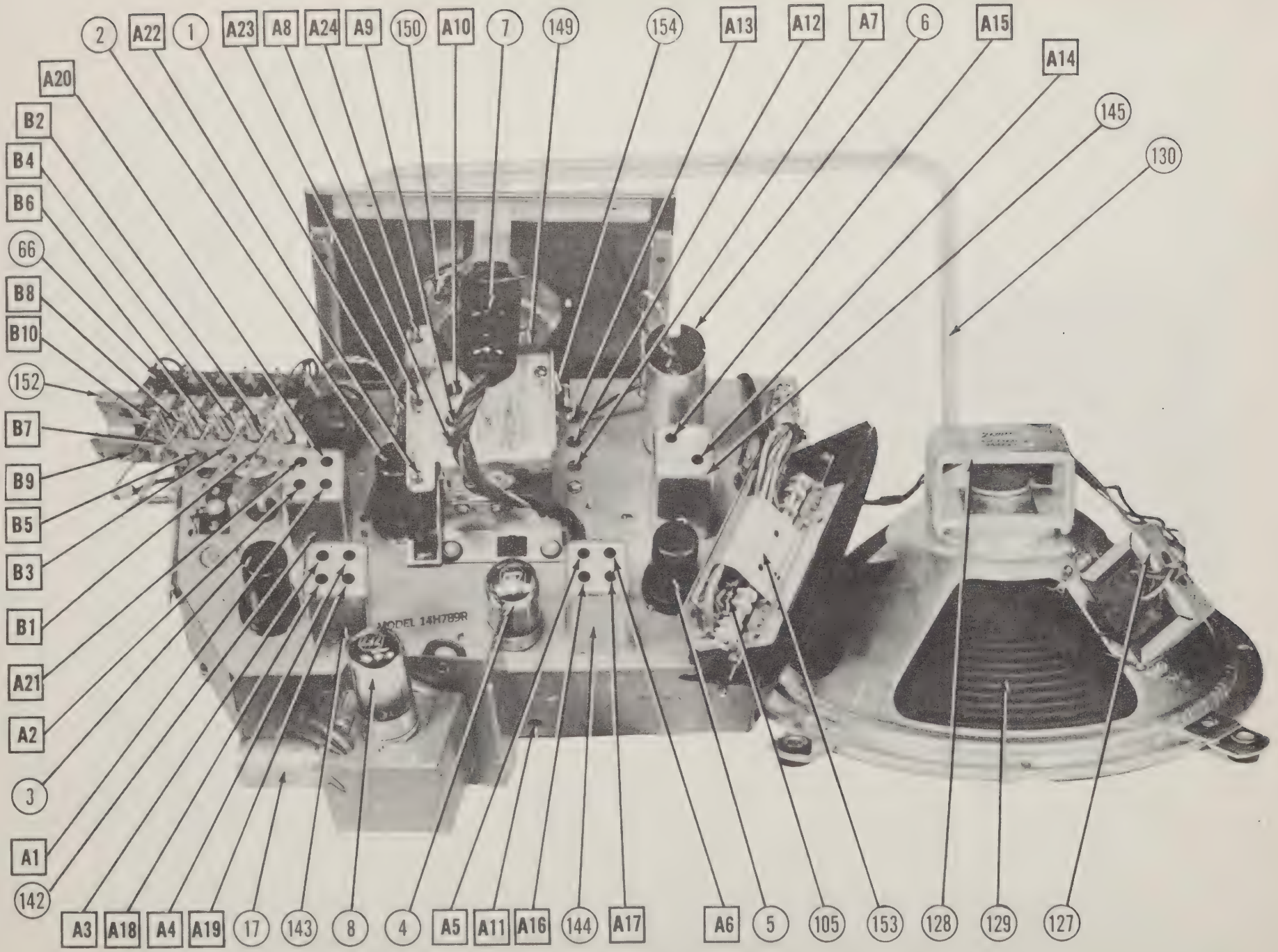
DATE 5/48-#4811-24 SET #41-FOLDER #24

ZENITH MODEL
14H789 (Ch. 13D22)

ZENITH MODEL
14H789 (Ch. 13D22)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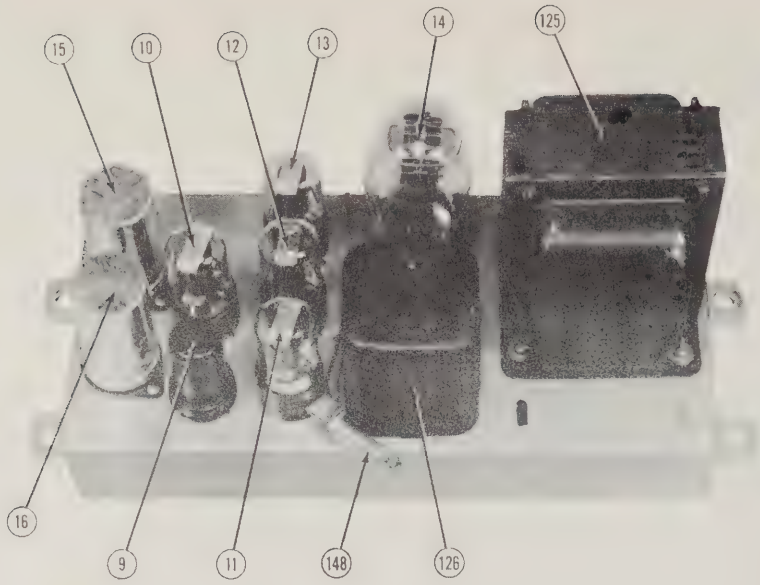
MODEL 14H789R

ZENITH MODEL
14H789 (Ch. 13D22) PAGE 3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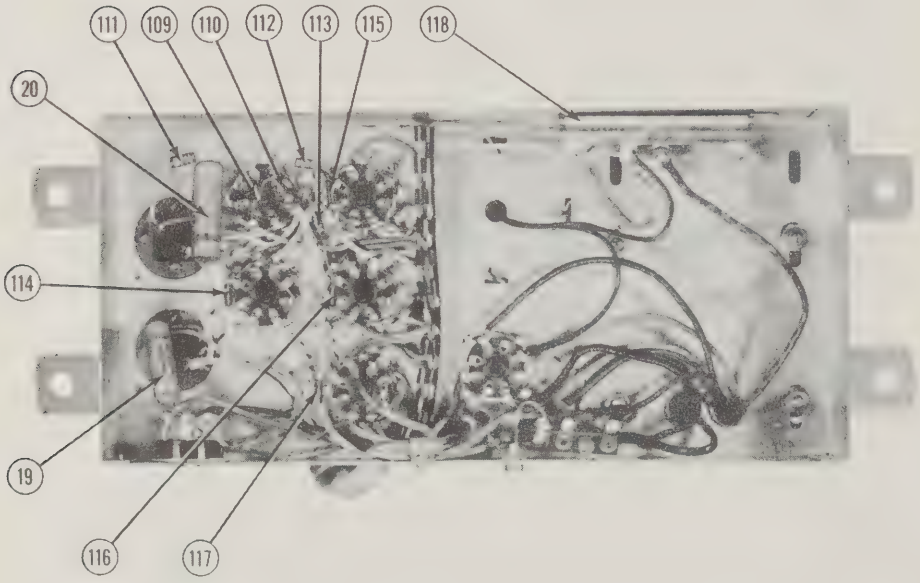
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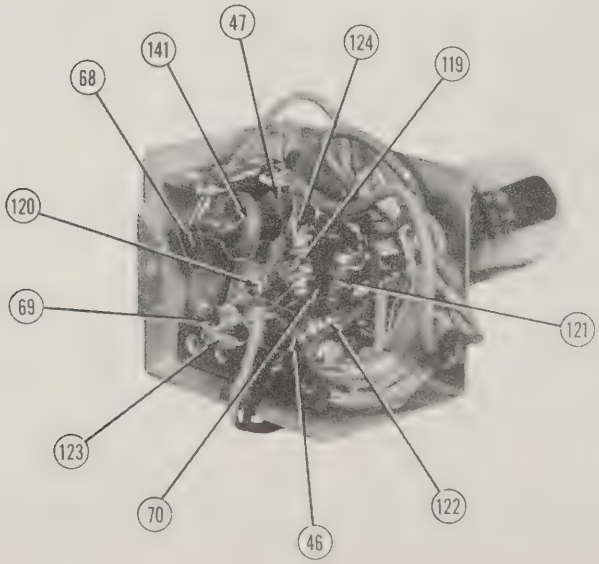
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6SB7Y	6SB7Y	8R	
3	1st IF Amp.	6SG7	6SG7	8BK	
4	2nd IF Amp.	7W7	7W7	8BJ	
5	Limiter	6SH7	6SH7	8BK	
6	Disc.-Det.-AVC-AF	6S8GT	6S8GT	8CB	
7	Tuning Eye	6AL7GT	6AL7GT	8CH	
8	Phono Osc.-Amp.	7F7	7F7	8AC	
9	Inverter	6J5	6J5	6Q	
10	Power Output	6V6GT	6V6GT	7AC	
11	" "	6V6GT	6V6GT	7AC	
12	"	6V6GT	6V6GT	7AC	
13	"	6V6GT	6V6GT	7AC	
14	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
15A	15	450	22-1515		UP22245C	DY-4x20-450#	EL-15	▲ Filter
B	30	450			†#		UT-30	▲ "
16A	15	450	22-1515		UP22245C	DY-4x20-450#	EL-15	▲ "
B	30	450			†#		UT-30	▲ "
17	30	300	22-1449	AF6J	UP3035	DY-30-350	EL-33	Phono Amp. Decoupling
18	.005	600	22-1041	684-005	DT6D5	MPH-6-005	TC-25	Line Filter
19	.002	1000	22-1134	1084-002	MD16D2	STM-16-002	TR-22	Output Plate Bypass
20	.02	600	22-1128	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
21	.02	600	22-830	684-02	DT6S2	ST-6-02	TC-12	" "
22	.05	600	22-171	684-05	DT6S5	ST-6-05	TC-15	AF Plate Decoupling
23	.004	600	22-448	684-004	DT6D4	ST-6-004	TC-24	Tone Compensation
24	.002	600	22-912	684-002	DT6D2	ST-6-002	TC-22	" "
25	.005	600	22-1041	684-005	DT6D5	ST-6-005	TC-25	" "
26	.02	400	22-1127	484-02	DT4S2	ST-4-02	TC-12	" "
27	.01	400	22-1126	484-01	DT4S1	ST-4-01	TC-11	" "
28	.005	200	22-319	484-005	DT6D5	ST-6-005	TC-25	Tuning Ind. Filter
29	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	Phono Coupling
30	.02	400	22-1127	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
31	.004	600	22-448	684-004	DT6D4	ST-6-004	TC-24	" "
32	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	AF Cathode Bypass
33	.02	600	22-830	684-02	DT6S2	ST-6-02	TC-12	Limiter Plate Decoup.
34	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	Limiter Screen Bypass
35	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Decoup.
36	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
37	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	2nd IF Grid Filter
38	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoup.
39	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
40	.02	200	22-1386	484-02	DT2S2	ST-4-02	TC-12	AVC Filter
41	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	Conv. Plate Decoup.
42	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	RF Bypass Pwr. Supply
43	.01	600	22-196	684-01	DT6S1	ST-6-01	TC-11	RF Screen Bypass
44	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
45	.05	200	22-829	484-05	DT2S5	ST-4-05	TC-15	Filament Bypass
46	.002	600	22-912	684-002	DT6D2	ST-6-002	TC-22	RF Coupling
47	.02	200	22-1386	484-02	DT2S2	ST-4-02	TC-12	Osc. Grid Cap.
48	500	600	22-1138	1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass
49	100	600	22-365	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
50	50	600	22-289	1468-00005	5W5Q5	MO.5-45	1FM-45	Tone Compensation
51	500	600	22-1138	1468-0005	5W5T5	MO.5-35	1FM-35	De-emphasis
52	50	500	22-1367	1468-00005	5W5Q5	MO.5-45	1FM-45	Limiter Grid Filter-Cer.
53	100	600	22-162	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
54	1000	600	22-1169	1468-001	1W5D1	MW.5-21	1FM-21	Conv. Screen Bypass
55	50	500	22-1367	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
56	52	500	22-1509					Fixed Trimmer-Cer.

DATE 5/48-#4811-24 SET #41-FOLDER #24

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
57	52	500	22-1509					Fixed Trimmer-Cer.
58	17	500	22-1505					" " "
59	35	500	22-1508	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling-Cer.
60	50	500	22-1367	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Bypass-Cer.
61	2000	600	22-912	1467-002	1W5D2	MW.5-22	1FM-22	Fixed Pad-See Note
62	22	500	22-1506					Fixed Trimmer-Cer.
63	150	300	22-1503	1468-00015	5W5T15	MO.5-315	1FM-315	RF Grid Filter
64	25	500	22-1507	1468-000025	5W5Q25	MO.5-425	MS-425	RF Coupling-Cer.
65	10	500	22-1504	1468-00001	5W5Q1	MO.5-41	MS-41	" " "
66	480	500	22-868					Fixed Trimmer
67	750	600		1468-00075	1W5T7	MO.3-37	1FM-37	Phono Tone Comp.
68	50	500	22-1367	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Feedback
69	50	500	22-1367	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Feedback
70	100	500	22-162	1468-0001	5W5T1	MO.5-31	1FM-31	Grid Leak Cap.
71	100	500	22-162	1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling.
72	4.7	500		1468-000005	5W5V5	MO.5-55	MS-55	RF Coupling-Cer.

Note-Not used in some models.
Parallel sections to obtain desired capacity.
† Omit bypass section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
73A	2.5 Meg	½	63-1349	D13-133XX		Volume Control tapped @ 500KΩ & 1 Meg.
B	Shaft		Not Req.	E		Attach to 73A per instructions
C	Switch		" "	41		" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	IDENTIFICATION CODES
74	15KΩ	½	63-503	BTS-15K	Br.-Grn.-Or. Antenna Loading
75	100KΩ	½	63-260	BTS-100K	Br.-Blk.-Yl. RF Grid Filter
76	33KΩ	½	63-592	BTS-33K	Or.-Or.-Or. RF Screen Dropping
77	5600Ω	½	63-1448	BTS-5600	Grn.-Blue-Red Decoupling
78	47KΩ	½	63-593	BTS-47K	Yl.-Vi.-Or. Converter Grid
79	33KΩ	½	63-592	BTS-33K	Or.-Or.-Or. Oscillator Grid
80	18KΩ	2	63-510	BT-2-18K	Br.-Gray-Or. Converter Screen Dropping
81	220Ω	½	63-579		Red-Red-Br. Parasitic Suppressor
82	120Ω	½	63-626		Br.-Red-Br. " "
83	1000Ω	½	63-605	BTS-1000	Br.-Blk.-Red Converter Decoupling
84	100KΩ	½	63-260	BTS-100K	Br.-Blk.-Yl. AVC Network
85	2.2 Meg.	½	63-600	BTS-2.2 Meg.	Red-Red-Grn. " "
86	68KΩ	½	63-960	BTS-68K	Blue-Gray-Or. 1st IF Screen Dropping
87	1200Ω	½	63-1446	BTS-1200	Br.-Red-Red 1st IF Plate Decoupling
88	33KΩ	½	63-592	BTS-33K	Or.-Or.-Or. AVC Network
89	2200Ω	½	63-585	BTS-2200	Red-Red-Red 2nd IF Grid
90	120KΩ	½	63-1447	BTS-120K	Br.-Red-Yl. 2nd IF Screen Dropping
91	2200Ω	½	63-585	BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
92	33KΩ	½	63-592	BTS-33K	Or.-Or.-Or. Diode RF Filter
93	220KΩ	½	63-296	BTS-220K	Red-Red-Yl. Diode Load
94	33KΩ	½	63-592	BTS-33K	Or.-Or.-Or. Bleeder
95	100KΩ	1	63-380	BTA-100K	Br.-Blk.-Yl. Limiter Screen Dropping
96	100KΩ	1	63-380	BTA-100K	Br.-Blk.-Yl. Limiter Plate Decoupling
97	47KΩ	½	63-593	BTS-47K	Yl.-Vi.-Or. Limiter Grid
98	100KΩ	½	63-260	BTS-100K	Br.-Blk.-Yl. De-emphasis
99	100KΩ	½	63-260	BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
100	100KΩ	½	63-260	BTS-100K	Br.-Blk.-Yl. " " "

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
101	15 Meg.	1/4	63-[illegible]	BTS-15 Meg.	Br.-Grn.-Blue AF Grid
102	22KΩ	1/4	63-[illegible]	BTS-22CK	Red-Red-Yl. AF Plate Load
103	1.8MΩ	1/4	63-[illegible]	BTS-1.8E	Br.-Blk.-Yl. AF Plate Decoupling
104	82KΩ	1/4	63-681	BTS-82K	Gray-Red-Or. Tone Compensator.
105	15KΩ	1/4	63-607	BTS-15K	Br.-Grn.-Or. " "
106	39000Ω	1/4	63-[illegible]	BTS-3900	Or.-Or.-Red Tuning Indicator Cathode
107	33Ω	1/4	63-620	BW-1/2-33	Or.-Or.-Blk. Wire
108	2.2 Meg.	1/4	63-600	BTS-2.2 Meg.	Red-Red-Grn. Tuning Indicator Filter
109	2200Ω	1/2	63-[illegible]	BTS-2200	Red-Red-Red Phase Inverter Cathode
110	47KΩ	1/4	63-[illegible]	BTS-47K	Yl.-Vi.-Or. Phase Inverter Grid-See Note 1
111	47KΩ	1/4	63-648	BTS-47K	Yl.-Vi.-Or. Phase Inverter Plate Load
112	470KΩ	1/4		BTS-470K	Yl.-Vi.-Yl. Output Grid-See Note 2
113	330KΩ	1/4		BTS-330K	Or.-Or.-Yl. " " " " 3
114	100Ω	1/2	63-577	BW-1/2-100	Br.-Blk.-Br. Parasitic Suppressor
115	100Ω	1/2	63-577	BW-1/2-100	Br.-Blk.-Br. " "
116	100Ω	1/2	63-577	BW-1/2-100	Br.-Blk.-Br. " "
117	100Ω	1/2	63-577	BW-1/2-100	Br.-Blk.-Br. " "
118A	7Ω		63-1551	AB-7Ω	Output Cathode
B	1000Ω			AB-1000	Filter
119	1 Meg.	1/4	63-441	BTS-1 Meg.	Br.-Blk.-Grn. Phono Oscillator Grid
120	47KΩ	1/4	63-648	BTS-47K	Yl.-Vi.-Or. Phono Oscillator Plate Load
121	1.8 Meg.	1/4	63-[illegible]	BTS-1. Meg.	Br.-Grn.-Blue Phono Detector Grid
122	47KΩ	1/4	63-648	BTS-47K	Yl.-Vi.-Or. Phono Detector Plate Load
123	5600Ω	1/4	63-1448	BTS-5600	Grn.-Blue-Red Phono Oscillator Plate Decoupling
124	33KΩ	1/4	63-[illegible]	BTS-33K	Or.-Or.-Or. Phono Decoupling

Note 1 - Some models use 47KΩ in this application.
Note 2 - Some models use 220KΩ in this application.
Note 3 - Some models use 180KΩ in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDARSON PART No.	REPLACEMENT DATA MERIT PART No.
125	117V AC @ 1.5A	700V CT @ .230A	5.0V AC @ 3.0A	6.4V AC @ 5.3A	95-956	P-6315§	T-22R34‡	‡Drill new mounting holes. §Mount vertically with universal mtg. brackets.

FILTER CHOKE

ITEM NO.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA ZENITH PART NO.	REPLACEMENT DATA STANCOR PART NO.	REPLACEMENT DATA THORDARSON PART NO.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
126	.230A	100Ω	3 Henries	95-957				

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDAR'N PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
127	4800Ω CT	3.4Ω	260Ω CT	.3Ω	206-600		T22S74‡	A-2935	‡Drill new mounting holes.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS FIELD	RATINGS VC IMP.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
128	PM	3.4Ω	49-600	ST-102 Mod. P2-8*		*Fabricate mounting brackets to duplicate original. Replace output transformer to match 8Ω voice coil.
	CONE DIA.	VC DIA.				
129	12"	1"	209-600			

R F COILS

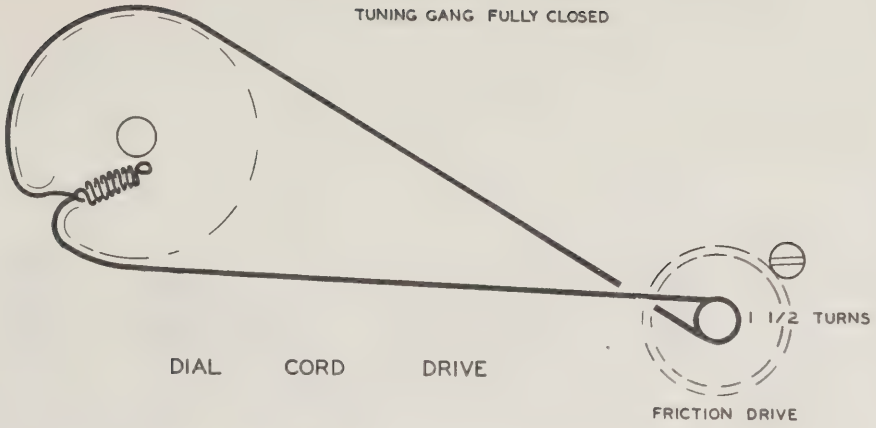
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA MEISSNER PART No.	
130	Loop Ant.	.2Ω	1Ω			
131	Loop Load. Coil		.6Ω	S-11591		
132	SW Ant.Coil		0Ω	S-12282		
133	FM " "	0Ω	0Ω	S-12301		
134	BC RF Coil		12Ω	S-12293		
135	SW " "		0Ω	S-12291		
136	FM " "	0Ω	0Ω	S-12302		
137	Wave Trap		40Ω	S-12281		
138A	BC Osc.Coil	1.5Ω	9.6Ω	S-11344		
B	Auto " "		12Ω			
139	SW " "		0Ω	S-12292		
140	FM " "		0Ω	S-12303		
141	Phono Osc. Coil		1.5Ω			
142A	AM 1st IF	9Ω	8.6Ω	S-12249		
B	FM " "	.6Ω	.6Ω			
143A	AM 2nd IF	8.3Ω	7.5Ω	S-12250		
B	FM " "	.7Ω	.7Ω			
144A	AM 3rd IF	8Ω§§	7Ω	S-12251		§§Includes both primaries.
B	FM " "		.6Ω			
145	Disc. Trans.	1.2Ω	1.3Ω	S-12252		
146	Line Choke		0Ω	S-12256		
147	Par. Supp. Choke		0Ω			

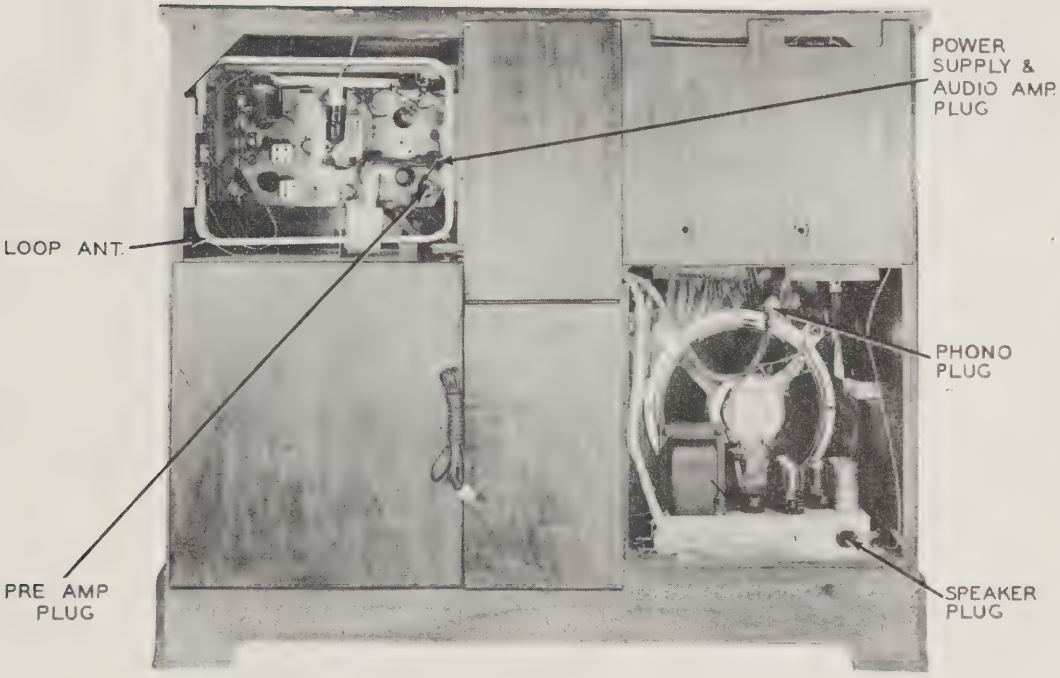
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA	INSTALLATION NOTES
148-150	Bayonet	6-8	0.25	Blue	100-36		Type 44

MISCELLANEOUS

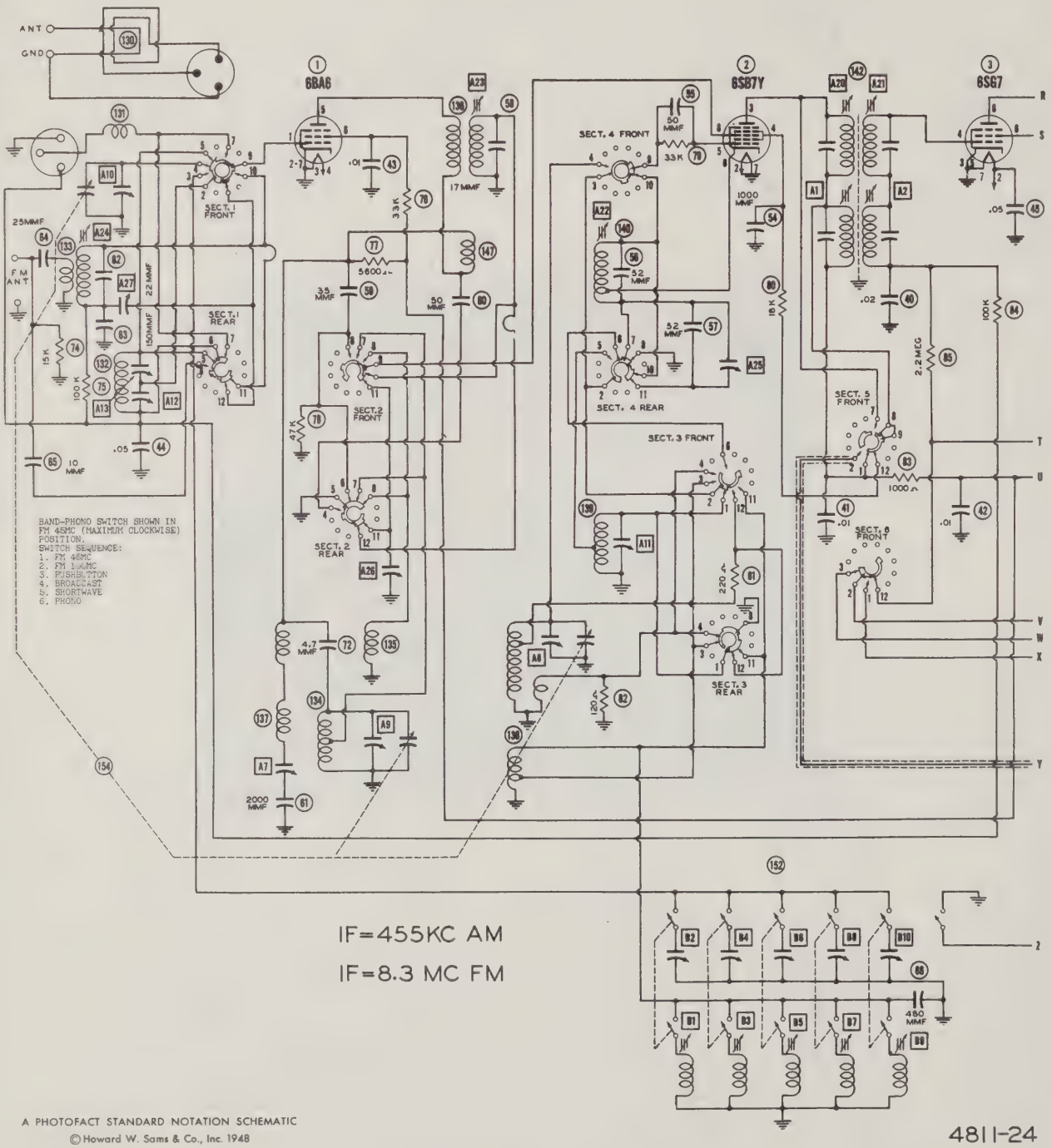
ITEM No.	PART NAME	ZENITH PART No.	NOTES
151	Switch	S-12356	Band-Phono
152	"	85-370	Pushbutton
153	"	S-9606	Tone
154	3 Gang Var. Cap.	22-1363	AM (24-500MMF, 17-215MMF, 16-90MMF)
A7	Trimmer Strip	22-1497	(Wave Trap Adj.
A12			(SW Ant. Adj.
A13			" " "
A11	Trimmer	22-1502	" Osc. "
A26	"	22-1494	FM RF Adj.
A27	"	22-1493	FM Ant. Adj.
	Dial Scale	26-338	
	Dial Pointer	59-159	
	Dial Crystal	192-96	





DISASSEMBLY INSTRUCTIONS

1. Remove three push-on type control knobs.
2. Push up on metal lever at top of pushbutton assembly. Remove pushbutton assembly from cabinet.
3. Push up on metal lever at top of tone control assembly. Work assembly through hole so that complete assembly can be removed with the chassis.
4. Remove loop antenna plug from chassis.
5. Remove four wood screws holding loop antenna in cabinet. Remove loop from cabinet.
6. Disconnect phono oscillator plug.
7. Remove three wood screws holding phono oscillator in cabinet. Remove oscillator from cabinet.
8. Remove two plugs from tuning chassis.
9. Remove short wave antenna leads from tuning chassis.
10. Remove two hex head screws holding pushbutton switches in cabinet.
11. Remove four Phillips head screws holding tuning chassis in cabinet. Remove tuning chassis from cabinet.
12. Remove eight wood screws holding the upper small panel to rear of cabinet. Remove panel from cabinet.
13. Remove pilot light plug from power supply chassis.
14. Remove speaker plug from power supply chassis.
15. Remove phono-motor & phono-pickup plug from record changer.
16. Remove four hex head screws holding power supply chassis in cabinet. Remove chassis from cabinet.
17. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



IF=455KC AM

IF=8.3 MC FM

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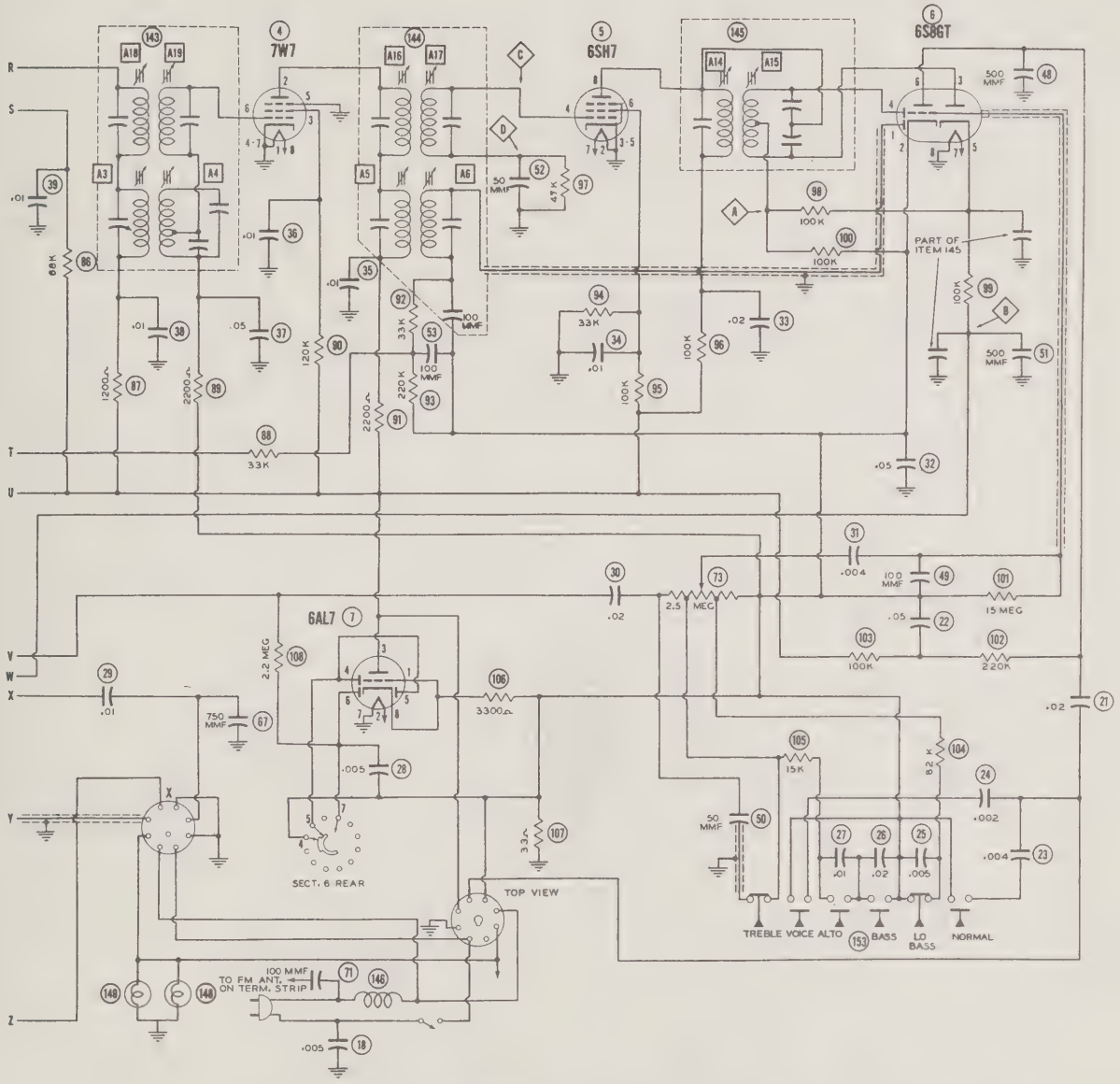

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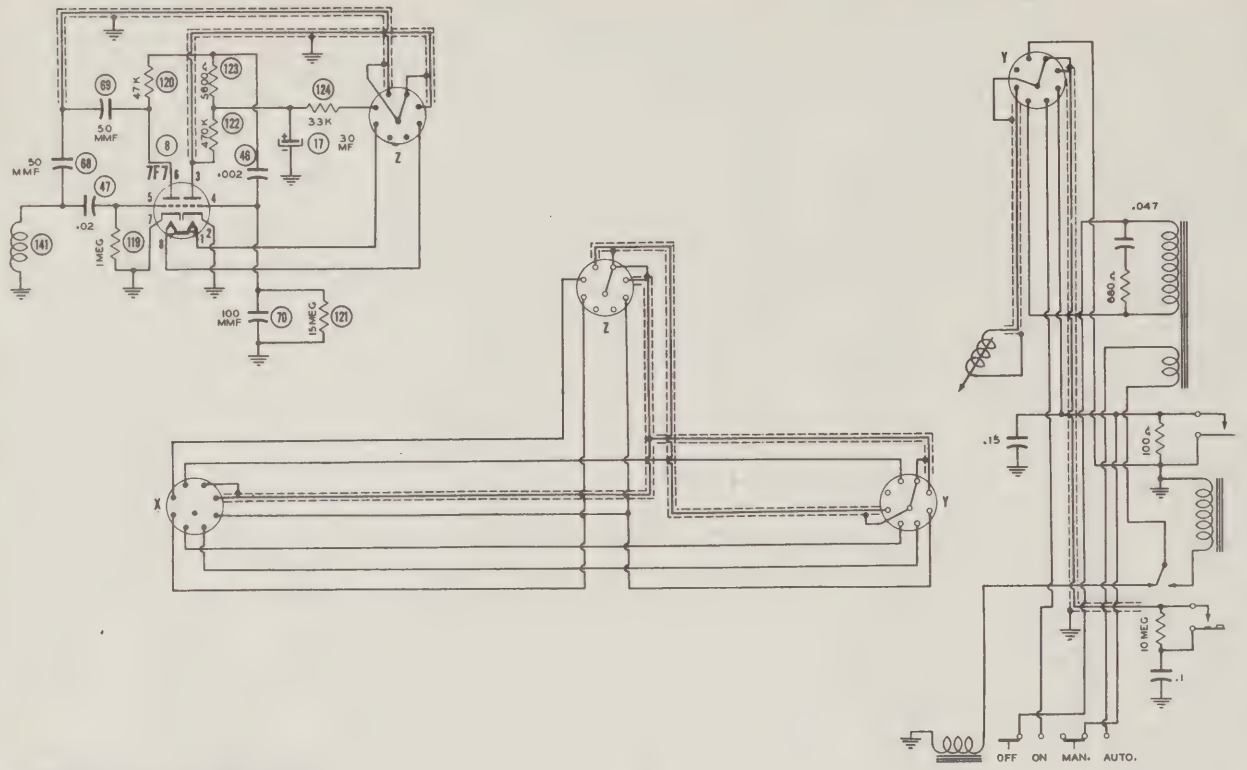

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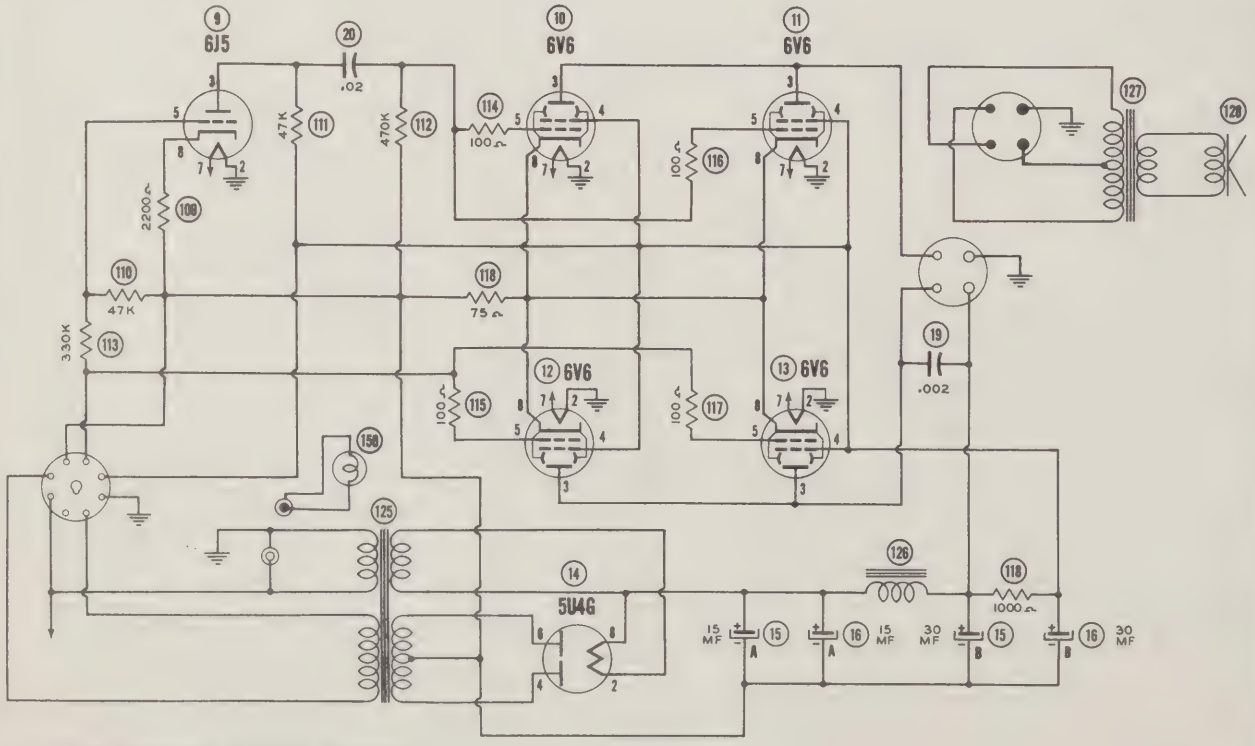

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VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6BA6	-.5VDC	0V.	0V.	6.4VAC	200VDC	122VDC	0V.	-	-
2	6SB7Y	0V.	6.4VAC	255VDC	102VDC	-5VDC§	0V.	0V.	0V.	-
3	6SG7	0V.	6.4VAC	0V.	-.6VDC	0V.	115VDC	0V.	255VDC	-
4	7W7	0V.	255VDC	85VDC	0V.	0V.	-1.4VDC	0V.	6.4VAC	-
‡ 5	6SH7	0V.	0V.	0V.	-.3VDC	0V.	40VDC	6.4VAC	67VDC	-
6	6S8GT	-1.8VDC	-1.6VDC	-2VDC	-2VDC	-1.1VDC	100VDC	6.4VAC	0V.	-2VDC
7	6AL7GT	-.5VDC	6.4VAC	255VDC	-.8VDC	-.8VDC	-.8VDC	0V.	-.5VDC	-
** 8	7F7	6.4VAC	0V.	55VDC	-.8VDC	-.8VDC	100VDC	0V.	0V.	-
9	6J5	0V.	0V.	142VDC	-1.6VDC	-1.1VDC	-1.6VDC	6.4VAC	3.8VDC	-
10	6V6GT	0V.	0V.	310VDC	265VDC	-.3VDC	-.3VDC	6.4VAC	13VDC	-
11	6V6GT	0V.	0V.	310VDC	265VDC	-.3VDC	-.3VDC	6.4VAC	13VDC	
12	6V6GT	0V.	0V.	310VDC	265VDC	-.4VDC	-.4VDC	6.4VAC	13VDC	
13	6V6GT	0V.	0V.	310VDC	265VDC	-.4VDC	-.4VDC	6.4VAC	13VDC	
14	5U4GT	0V.	340VDC	0V.	350VAC	0V.	350VAC	0V.	340VDC	

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	6BA6	2.5 Meg.	0Ω	0Ω	.05Ω	55KΩ	90KΩ	0Ω	-	-
2	6SB7Y	0Ω	.05Ω	50KΩ	70KΩ	33KΩ	2Ω	0Ω	4Ω	-
3	6SG7	0Ω	.05Ω	0Ω	2.5 Meg.	0Ω	120KΩ	0Ω	50KΩ	-
4	7W7	0Ω	50KΩ	170KΩ	0Ω	0Ω	2.2KΩ	0Ω	.05Ω	-
‡ 5	6SH7	0Ω	0Ω	0Ω	47KΩ	0Ω	25KΩ	.05Ω	150KΩ	-
6	6S8GT	250KΩ	33Ω	100KΩ	100KΩ	200KΩ	370KΩ	.05Ω	0Ω	15 Meg.
7	6AL7GT	3.3KΩ	.05Ω	50KΩ	2.5 Meg.	2.5 Meg.	2.5 Meg.	0Ω	3.3KΩ	-
** 8	7F7	.05Ω	0Ω	550KΩ	15 Meg.	1 Meg.	190KΩ	0Ω	0Ω	-
9	6J5	0Ω	0Ω	100KΩ	33Ω	47KΩ	33Ω	.05Ω	2.2KΩ	-
10	6V6GT	0Ω	0Ω	50KΩ	50K..	470KΩ	470KΩ	.05Ω	110Ω	-
11	6V6GT	0Ω	0Ω	50KΩ	50KΩ	470KΩ	470KΩ	.05Ω	110Ω	-
12	6V6GT	0Ω	0Ω	50KΩ	50KΩ	370KΩ	370KΩ	.05Ω	110Ω	-
13	6V6GT	0Ω	0Ω	50KΩ	50KΩ	370KΩ	370KΩ	.05Ω	110Ω	-
14	5U4GT	0Ω	50KΩ	INF.	75Ω	INF.	70Ω	INF.	50KΩ	-

**VOLTAGE AND RESISTANCE READINGS TAKEN IN PHONO POSITION.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS

ANTENNA TO RF GRID	10X	600KC
RF GRID TO CONV. GRID	2X	600KC
CONVERTER GAIN	30X	IN 600KC
		OUT 455KC
INPUT IF	.5X	455KC
1st IF TUBE	140X	455KC
INTER. IF	.03X	455KC
2nd IF TUBE	180X	455KC
OUTPUT IF	.5X	455KC
AUDIO	35X	400 ∿
OUTPUT	17X	400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) volts to the AVC line.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer on horizontal line across center of dial.

The alignment slugs in IF Transformers are threaded and screw into the coil forms. Care should be exercised in making adjustments as too much pressure will strip the threads and make alignment impossible.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to Pin 8 (grid) of 6SB7Y. Low side to chassis.	455KC	BC (3 positions clockwise)	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4, A5,A6.	Adjust for maximum output.
2	.05 MFD	High side to Pin 1 (grid) of 6BA6. Low side to chassis.	"	Auto. (4 positions clockwise)	Depress any pushbutton	"	A7	Adjust for minimum output.
3		Loop	1600KC	BC	1600KC	"	A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4		"	1400KC	"	Tune for maximum output.	"	A9,A10	Adjust for maximum output
5	400Ω carbon res.	High side to ant. terminal. Low side to chassis. Disconnect line antenna.	11.7MC	SW (2 positions clockwise)	11.7MC	"	A11	Adjust for maximum output
6	"	"	"	SW	Tune for maximum output.	"	A12	" " " "
7	"	"	9.7MC	"	"	"	A13	Rock tuning cap. and adjust for maximum output. repeat Steps 5, 6 & 7 until no further improvement can be made.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Lead from VTVM must be shielded.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8	.05 MFD	High side to Pin 4 (grid) of 6SH7. Low side to chassis.	8.3MC (Unmodulated)	FM-45 (fully clockwise)	Tuning control fully clockwise.	DC probe in series with 200K Ω to Point ◇. Common to chassis	A14	Adjust for maximum deflection.
9	.05 MFD	"	"	"	"	DC probe in series with 200K Ω to Point ◇. Common to chassis.	A15	Use a zero center scale meter if available. Increase signal input to obtain good positive and negative deflection before adjusting A15 for zero deflection.
10	.05 MFD	High side to Pin 6 (grid) of 7W7. Low side to chassis.	"	FM-45	"	DC probe in series with 200K Ω to Point ◇. Common to chassis.	A16, A17	Adjust for maximum deflection.
11	.05 MFD	High side to Pin 4 (grid) of 6SG7. Low side to chassis.	"	"	"	"	A18, A19	Solder 300Ω carbon resistor between terminals 2 & 3 of 2nd IF Trans. (143). Adjust for maximum deflection
12	.05 MFD.	"	"	"	"	"	A20, A21	Adjust for maximum deflection.
								Remove 300Ω resistor used in Steps 11 & 12. Continue with FM-RF Alignment in Step 13.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

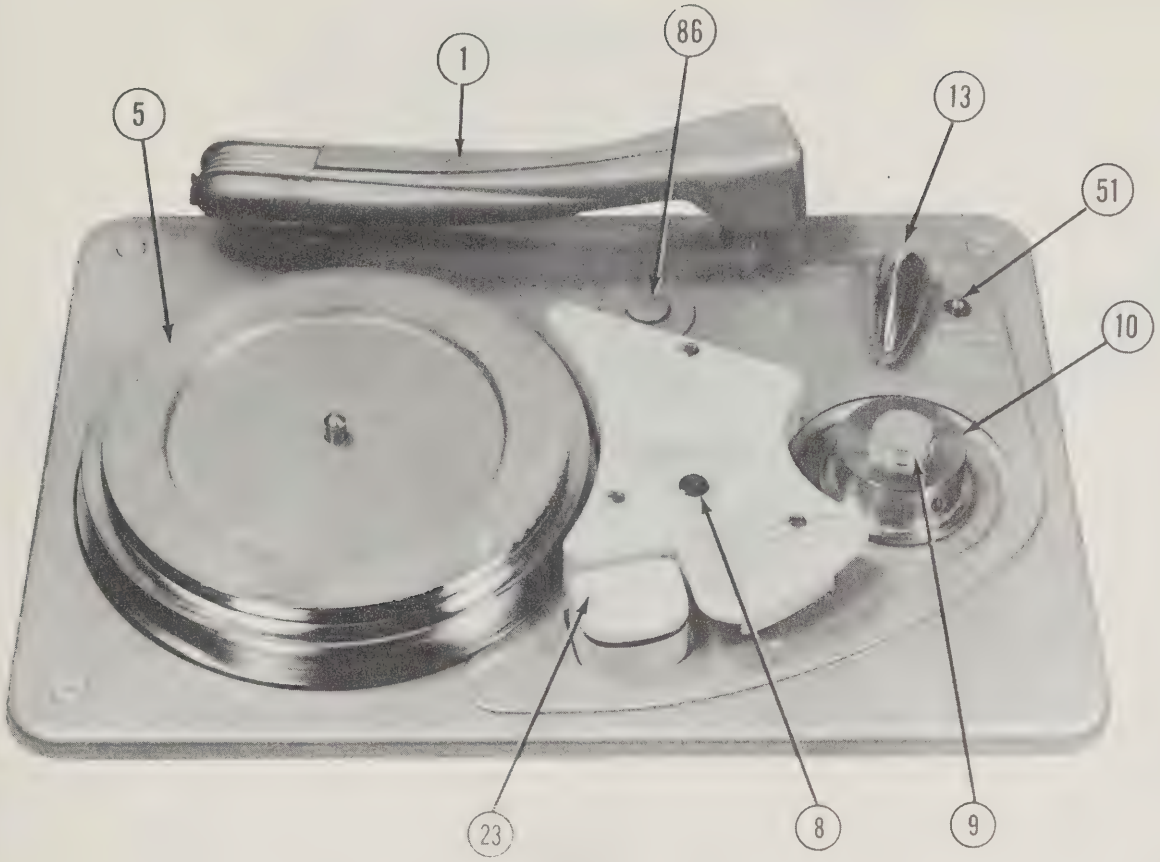
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
8	.05 MFD	High side to Pin 4 (grid) of 6SG7. Low side to chassis.	8.3MC (freq. modulated	FM-45	Tuning control fully clockwise.	Vertical input to Point ⊕. Ground to chassis.	A17,A18 A19,A18	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
9	.05 MFD	High side to Pin 8 (grid) of 6SB7Y. Low side to chassis.	"	"	"	"	A21, A20	"
10	.05 MFD	High side to Pin 4 (grid) 6SG7. Low side to chassis.	"	"	"	Vertical input to Point ⊖. Ground to chassis.	A14, A15	Use full vertical gain in scope and attenuate output of sig. gen. to just give usable pattern, in order to prevent saturation of limiter. Alternately adjust A14 for maximum amplitude and A15 for maximum straightness of crossover lines with crossover occurring at center of Pattern per Fig. 2. Continue with FM-RF Alignment. in Step 13.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
13	270Ω carbon res.	High side to ant. terminal. Low side to chassis. Disconnect line ant.	98MC (unmodulated)	FM-100	98MC	DC probe to Point ◇. Common to chassis.	A22	Adjust for maximum deflection.
14	"	"	"	"	Tune for maximum output.	"	A23, A24	"
15	"	"	45MC (unmodulated)	FM-45	45MC	"	A25	"
16	"	"	"	"	Tune for maximum output.	"	A26, A27.	Adjust for maximum deflection. Secure tuning slug shafts with speaker cement.

FIG. 1

FIG. 2



CRESCENT MODEL E1000
WIRE RECORDER

CRESCENT MODEL E1000
WIRE RECORDER

GENERAL INFORMATION

The Crescent model E1000 wire recorder is a combination record player and magnetic recorder-reproducer. The standard spool gives approximately an hour of continuous recording. The recordings may be played back immediately after the wire has been rewound. A recording will last indefinitely since the playback process has no effect on the wire; or a new recording may be made on an old spool, since in the recording process, any previous recording is erased. The turntable serves as a turntable for standard records as well as the takeup spool for the recording mechanism. One motor is used, which, through the action of the control mechanism, serves as a drive to the turntable and also for the rewind pulley. The rewind speed is greater by the ratio of pulleys used.

A plastic tape leader is attached at each end of the wire, which is used to thread the wire on the turntable, or the storage spool, and the other to trip the reset switch to shut off the motor at the end.

Manufactured by

CRESCENT INDUSTRIES, INC. • 3432 MILWAUKEE AVENUE

CHICAGO 41, ILLINOIS

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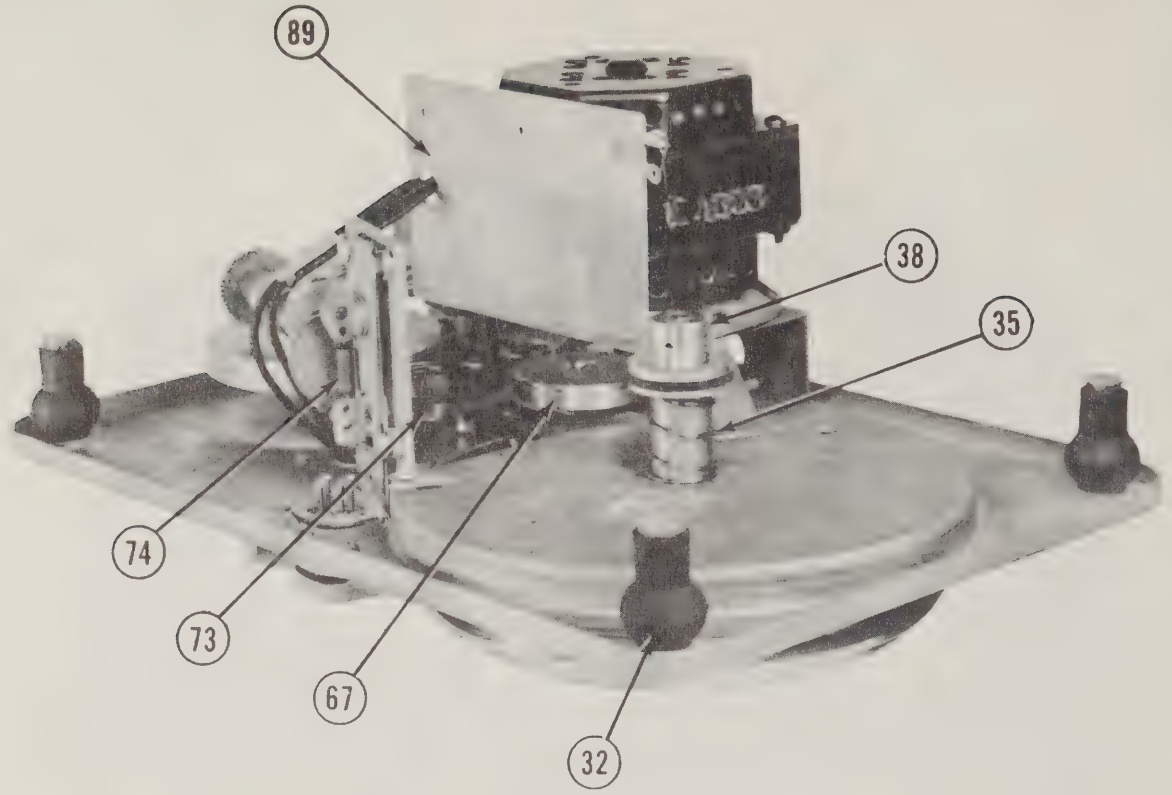


BOTTOM VIEW—LEFT SIDE

OPERATION

Proper placing of the wire on the machine is very important, as "wows" may result from improper procedure.

Proceed as follows:

Press the "Reset" button.

Before placing the wire on the mechanism, the recording head should be brought to its top position. This may be done by turning the selector switch knob to "Rewind" and stopping the head at the top of its travel.

Place the spool, label side up, over the hub (10), and press on the storage spool until it is firmly seated.

Loosen the end of the tape leader from the spool and carefully pull it past the recorder head. Place the tape leader in the channel in the rim of the turntable.

While holding the leader against the inner edge of the channel, rotate the turntable by hand until two complete turns of wire are in the channel. The full length of the leader must be pressed against the inner surface of the channel or speed variations will result.

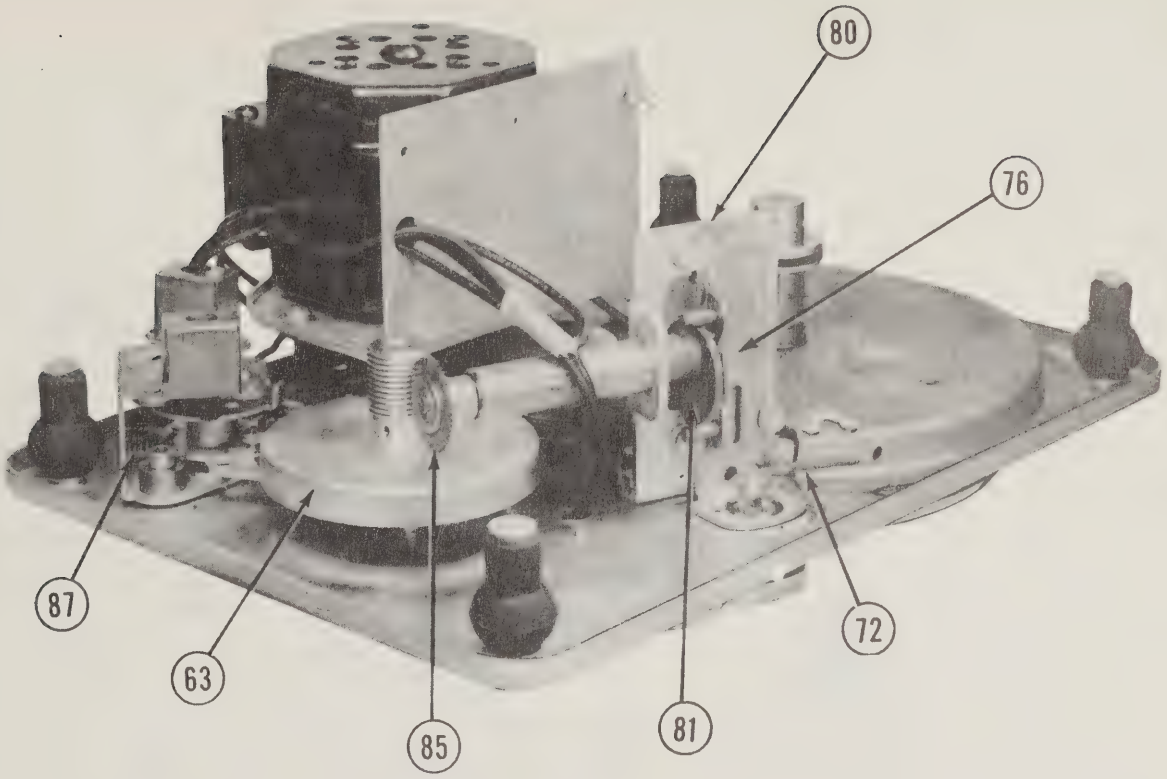
Press the "Reset" button (8) and turn the control knob (13) to "Play" or "Record" position, depending on which is to be accomplished. The mechanism will now play or record continuously for a length of time according to the size spool of wire in use.

If the recorder is not turned off manually, the tape leader which is fastened to the end of the wire passes under the switch housing (7) contacting the switch arm, thereby tripping the switch (21) shutting off the recorder automatically.

To rewind, place the tape leader in the channel of the storage spool and rotate the spool by hand until several turns of wire are in the channel. Turn the control knob to rewind and press the "Reset" button. The recorder will be shut off when the tape leader on the end of the wire contacts the switch arm of the automatic switch assembly.

The control knob (13) may be turned to any position, at any time without injury to the mechanism. When changing the position of the control switch, the knob should be snapped quickly from one position to the other. It is not necessary or advisable to touch the wire at any time.

To play records on the recorder, rewind the wire onto the spool. Turn the control knob to the "Off" position and press down on the "Reset." Place a record on the turntable; turn the control knob to the "Play" position; raise the pickup arm (1) from its



BOTTOM VIEW—RIGHT SIDE

rest, and swing it over the switch housing. Lower the arm to the record so the needle will come to rest in the starting groove of the record. When finished playing, return the pickup arm to the arm rest (27); turn the control knob to the "Off" position, and remove the record.

MECHANICAL ALIGNMENT

Motor Adjustment

1. Loosen the motor plate mounting screws.

2. Remove the plug button (86).

3. Insert the adjusting tool (WT1-A) through the hole made by removal of the plug button and move the motor until the adjusting tool slides over the motor shaft.

4. Tighten the mounting screws and remove the tool.

5. Replace the plug button.

Cam and Gear Adjustments

1. Loosen the set screw (82) holding the cam (81).

2. Insert a .006" feeler gauge between the gear shoulder (85-A) and the shaft housing (80-A).

3. Push the cam (81) and the shaft and gear assembly (85) toward one another until all play is taken up.

4. Tighten the cam set screw and remove the feeler gauge.

Worm and Gear Adjustment

Hold the fiber gear (85-B) with one hand and rotate the rewind pulley (63) with the other. Check the clearance between the fiber gear and worm of the rewind pulley (63) at least every 90° rotation of the fiber gear. The clearance should be as little as possible without causing drag or binding.

Make adjustment as follows:

1. Remove the switch housing (7).

2. Loosen the mounting screws (24) of the level wind frame (80) about ¼ to ½ turn.

3. Move the entire assembly until the proper adjustment is made.

4. Tighten the mounting screws.

5. Rotate the rewind hub (10) so the slide assembly will go through its entire stroke to be sure the recording head (23) does not bind on the edge of the hole in the mounting board.

A PHOTOFACT "EXPLODED" VIEW

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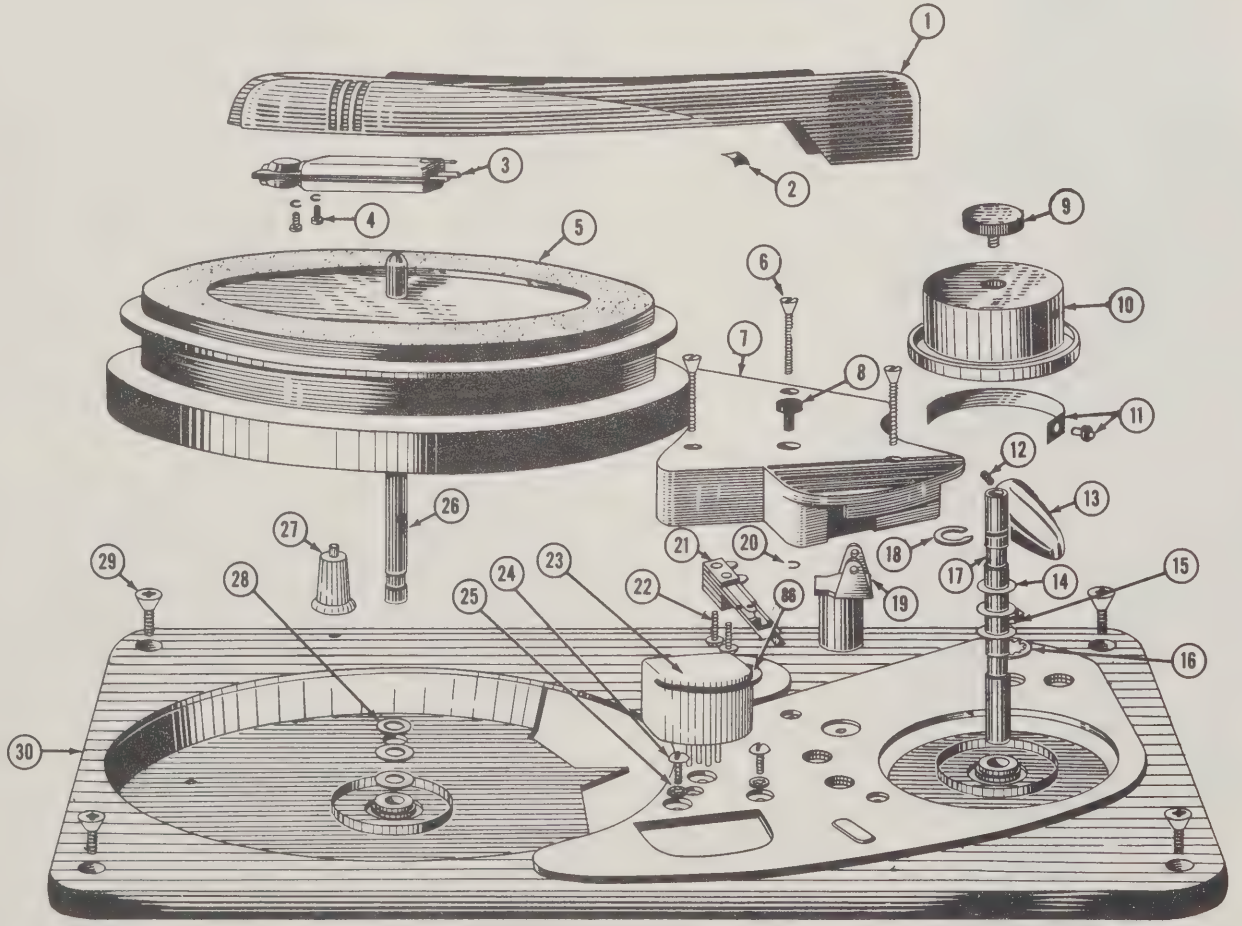
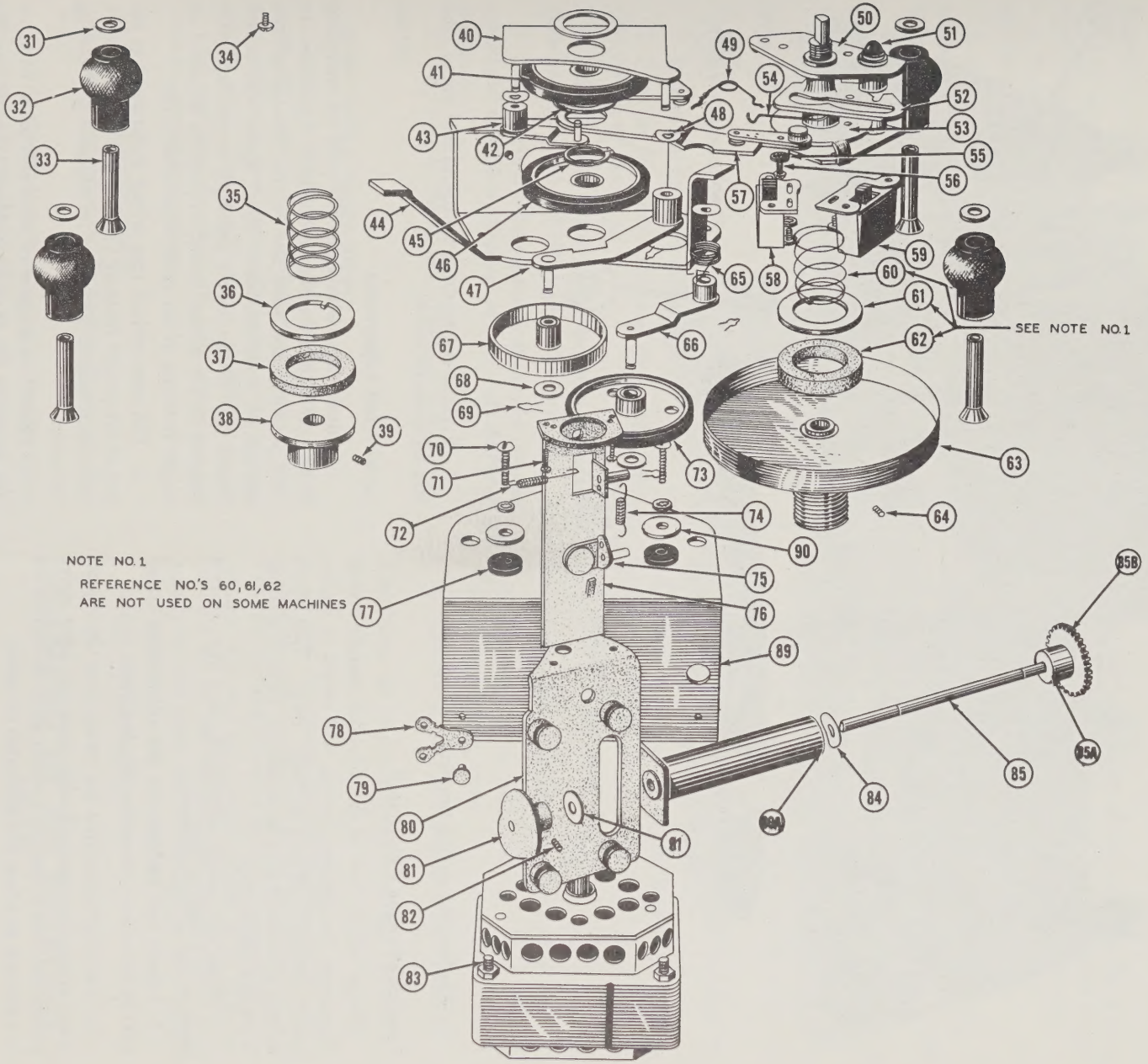
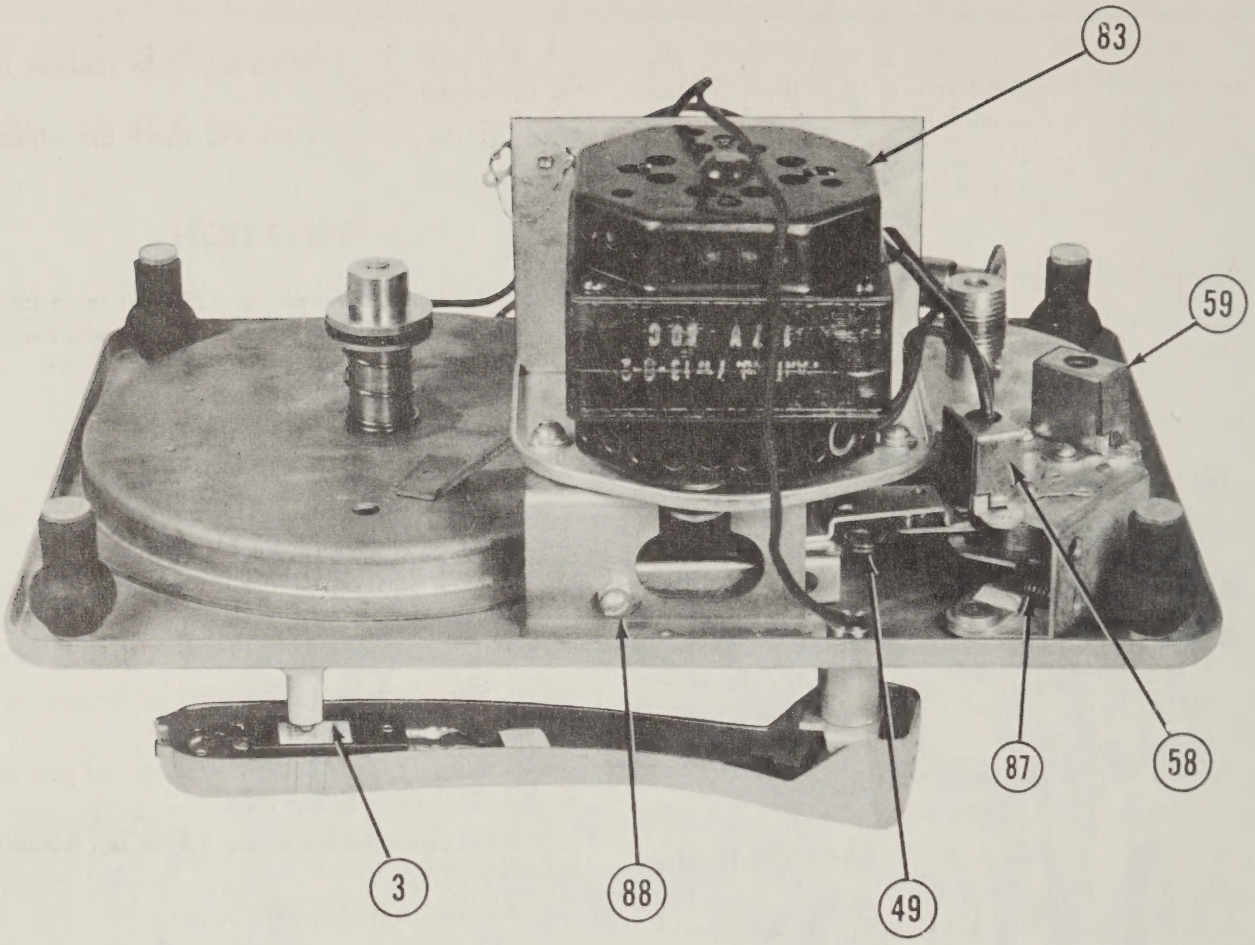



SEE NOTE NO.1
NOTE NO.1
REFERENCE NO.'S 60, 61, 62
ARE NOT USED ON SOME MACHINES



BOTTOM VIEW—REAR

6. Replace the switch housing.

Turntable Torque Adjustment

Proper adjustment of the turntable torque is very important. Insufficient torque will result in inconsistent turntable speed, causing "wow." Too much torque will result in wire breakage when switching from rewind to play.

1. With the power connected, turn the control knob to the "Play" position.

2. Loosen the locknut on the adjustment screw (88) in the motor mounting bracket (44).

3. If the turntable does not rotate, turn the adjustment screw counterclockwise until the idler drive pulley (41) barely makes contact with the turntable but enough to allow the turntable to rotate.

4. If the turntable is rotating, turn the screw clockwise until the turntable stops rotating; then back the screw out until the idler drive pulley barely makes contact with the turntable but enough to allow the turntable to rotate.

5. After this adjustment is made, turn the adjustment screw counterclockwise ¾ turn.

6. Tighten the locknut, being careful not to turn the adjustment screw.

Level Wind Adjustment

1. Rotate the rewind hub (10) until the recording head (23) is in its extreme downward position. In this position, the wire slot in the recording head should be approximately .020″ above the motor board (30). If the wire is too high or too low, with respect to the motor board, it may be adjusted by slight bending of the level wind slide (76).

2. The reset switch arm which is fastened to the top of the switch housing (7) should be 15/32″ from the motor board. This may be adjusted by bending the arm.

3. Thread on a spool of wire and let it wind on the turntable for 15 or 20 minutes. Observe how the wire lies in the channel of the turntable. With the proper adjustment, the wire should be even all the way across the channel. If the wire piles up in the top of the channel of the turntable, remove the turntable and add washers (28) until the condition is corrected. If the wire piles up in the bottom of the channel, washers should be removed.

4. Rewind the wire on the storage spool and observe how the wire lies on the spool. If the wire piles up on the top of the spool, remove the hub assembly and add washers (14) until this condition is corrected. If the wire piles up on the bottom of the spool, washers should be removed.

Rewind Spindle Assembly End Play

1. Remove the hub lock screw (9) and lift off the rewind hub.

2. Loosen the set screw (64) in the pulley assembly (63).

3. Place a .006" feeler gauge between the thrust washer (14) and the end of the bearing on the motor board.

4. Hold the top of the rewind shaft against the feeler gauge and press up on the rewind pulley until all end play is removed.

5. Tighten the set screw and remove the feeler gauge.

Turntable Assembly End Play

1. Loosen the set screw (39).

2. Push the felt washer (37) and the keyed washer (36) up out of the way.

3. Place a .006" feeler gauge between the turntable support (38) and the end of the bearing.

4. Push down on the turntable assembly (5) and up on the turntable support (38) until all end play is removed.

5. Tighten the set screw (39) and remove the gauge.

Selector Switch Toggle Action

Check the toggle action by moving the control knob (13) slowly from "Play" to "Rewind" position, and back, and observe the action of the selector switch (50). The toggle action should snap the bracket and post assembly (40) with a positive and even action to each position.

To adjust the toggle action:

1. Turn the control knob to the "Rewind" position.

2. Hold the drive control spring (49) with pliers, and loosen the set screw (56) in the arm and link assembly (57).

3. Moving the adjustment toward the rewind pulley (63) gives more positive action when switching to the "Rewind" position.

4. Moving the adjustment toward the switch assembly (50) gives more positive action when switching to "Play" position.

5. Normally, the position should be midway in the adjustment range.

6. Tighten the set screw and check the adjustment.

LUBRICATION

Factory lubrication should be sufficient for a long period of service; however, should it become necessary to lubricate the recorder, do so as follows:

Use Sta-Put No. 512 grease on the following:

1. Pins of the bracket and post assembly (40).

2. Washers (42), one of which is located on top of the bracket and post assembly (40).

3. Bearing surfaces of the drive control spring (49).

4. All moving parts of the switch assembly (50).

5. The worm gear of the rewind pulley assembly (63).

6. The shaft, of the level wind shaft and gear assembly (85); also bearing faces.

7. Level wind guides, of the frame and housing assembly (80).

8. Follower assembly (75).

Use Sta-Put No. 320 Oil on the following:

1. Turntable shaft (26).

2. Shaft assembly (17).

3. The cam surface of the level wind cam (81).

CAUTION: All Pressed Oilite Bearings do not require oil.

Do not, under any circumstances, permit oil or grease to come in contact with the rubber tires of the idler pulleys and drive pulley; the turntable rim; pulley (67), and the rewind pulley (63). If grease and oil are on the rubber tires, replace them with new ones and clean the other surfaces with carbon tetrachloride.

Avoid overlubrication.

CLEANING OF THE RECORDING HEAD

Weak reproduction, when not accompanied by high distortion, is probably due to dirt or foreign matter in the recording gap. Clean the gap with a stiff-bristle brush.

CAUTION: Do not use any metallic object for this purpose.

PARTS LIST FOR
CRESCENT MODEL E1000 WIRE RECORDER MECHANISM

Ref. No.	Part No.	DESCRIPTION
1	WR21-B	Pickup arm pivot spring assembly
2	4W13-A	Spring clip
3	7W45-A-1	Pickup cartridge—P-92B Shure Bros.
	7W45-A-2	Pickup cartridge—L-70 Astatic
	7W29-A	Phono lead
	6W13-A	Needle screw for pickup cartridge
4	6W7-A	Screw (4-40 x 1/4 R.H.M.S.)
5	WR28-B	Turntable assembly (including Ref. No. 26)
6	6W6-A	Screw (6-32 x 1 Phillips Head M.S.)
	WR27-B	Automatic switch assembly (including Ref. Nos. 7, 8, 20, 21, and 22; also the following parts not identified by a reference number)
	WR35-A	Switch bracket and arm assembly (part of auto. switch assembly)
	2W41-A	Switch bushing (part of auto. switch assembly)
	1W14-A	Switch cover (part of auto. switch assembly)
7	3W2-C	Switch housing (part of auto. switch assembly)
8	3W4-A	Switch button (part of auto. switch assembly)
9	2W9-A	Hub lock screw (part of rewind spool hub assembly)
10	WR11-A	Rewind spool hub assembly (including Ref. Nos. 9, 10, 11, and 17)
11	4W6-A	Hub spring (part of rewind spool assembly)
	2W20-A	Hub insert (part of rewind spool assembly)
12	6W1-A	Screw (8-32 x 1/8 Allen Head M.S.)
13	3W5-A	Control Knob
14	5W4-A	Fiber Washer
15	7W15-A	Hex Nut (3/8-32)
16	5W15-A	Lockwasher (3/8 I.T.)
17	WR20	Shaft assembly (part of rewind spool hub assembly)
18	5W3-A	Hub thrust washer
19	1W20-A	Arm support bracket (part of 30)
20	4W11-A	Retaining spring (part of auto. switch assembly)
21	WR22-A	Automatic switch (part of auto. switch assembly)
22	6W11-A	Screw (6-32 x 1/2 RHMS) (part of auto. switch assembly)
23*	WR37-C	Recording head (Crescent) (Identify by—metal shield on top only)
*	7W28-C	Recording head (St. George) (Identify by—no metal shields & two ridges on top of head)
*	7W20-C	Recording head (Lear) (Identify by—metal shield on top and bottom)
24	6W5-A	Screw (8-32 x 3/8 R.H.M.S.)
25	5W13	Lockwasher (No. 8 I.T.)
26	2W43-A	Turntable shaft (part of Ref. No. 5)
27	3W6-A	Pickup arm rest
28	5W4-A	Fiber washer
29	6W9-A	Screw (10-32 x 1/2 Phillips Flat Head)
30	WR38-A	Mounting board assembly (including Ref. 19)
31	5W16-A	Flat washer
32	7W18-A	Rubber mount
33	2W44-A	Mounting stud
34	6W10	Screw (pickup arm rest) (No. 6 x 3/8 S.M.S.)
35	4W5-A	Turntable spring
36	5W2-A	Keyed washer
37	5W1-A	Felt washer (turntable)
38	2W12-A	Turntable support
39	6W1-A	Set screw (8-32 x 1/8 Allen head)
40	WR15-A	Bracket and post assembly
41	WR9-B	Idler drive pulley

Ref. No.	Part No.	DESCRIPTION
42	5W11-A	Flat washer
43	WR14-A	Drive link assembly
44	1W24-B	Motor mounting bracket (part of 30)
45	7W10-A	Retainer ring
46	WR10-B	Motor drive pulley
47	WR12-A	Rewind link assembly
48	5W8-A	Friction washer
49	4W3-A	Drive control spring
50	WR2-B	Switch assembly (including 51, 52, 53 and 87)
51	WR3-A	Record button assembly (part of 50)
52	WR6-A	Cam lever assembly (part of 50)
53	WR5-A	Switch lever assembly (part of 50)
54	4W9-A	Retainer spring
55	5W6	Lockwasher (No. 6 I.T.)
56	6W8	Adjusting screw (6-32 x 5/32 R.H.M.S.)
57	WR18-A	Arm and link assembly
58	WR7-A	On-off switch assembly
59	WR8-A	On-off switch assembly
60**	4W4-A	Rewind pulley spring
61**	5W2-A	Keyed washer
62**	5W19-A	Felt washer (rewind)
63	WR26-A	Rewind pulley assembly
64	6W1-A	Set screw (8-32 x 1/8 Allen Head)
65	4W12-A	Coil spring
66	WR13-A	Rewind link assembly
67	WR19-A	Pulley and bushing assembly
68	5W7-A	Cloth washer
69	7W9-A	Spring clip
70	6W3-A	Motor mounting screw (8-32 x 5/8 R.H.M.S.)
71	6W7-A	Screw (4-40 x 1/4 R.H.M.S.)
72	4W8-A	Level wind spring
73	WR9-B	Idler drive pulley
74	4W7-A	Tension spring
75	WR33-A	Follower assembly (part of 76)
76	WR31-A	Level wind slide assembly
77	7W19-A	Rubber grommet
78	1W8-A	Solder lug
79	7W2-A	Rivet
80	WR36-A	Level wind frame and housing assembly
81	3W7-A	Level wind cam
82	6W1-A	Set screw (8-32 x 1/4 Allen Head)
83	7W13-B-1 7W13-B-2	Motor, complete; 105-125 volts, 60 cycles (Motor 7W13-B-1 and 7W13-B-2 are interchangeable.)
	7W31-B-1 7W31-B-2	Motor, complete; 220 volts, 60 cycles (Motor 7W31-B-1 and 7W31-B-2 are interchangeable.)
	7W32-B-1 7W32-B-2	Motor, complete; 105-125 volts, 50 cycles (Motor 7W31-B-1 and 7W32-B-2 are interchangeable.)
	7W33-B-1 7W33-B-2	Motor, complete; 220 volts, 50 cycles (Motor 7W33-B-1 and 7W33-B-2 are interchangeable.)
84	5W8-A	Friction washer
85	WR32-A	Level wind shaft and gear assembly
86	2W45-A	Plug button
87	4W2-A	Compression spring (part of 50)
88	6W3-A	Adjusting screw (8-32 x 5/8 R.H.M.S.)
89	1W22-B	Motor plate
90	5W5-A	Flat washer
91	5W17-A	Flat washer
	WT1-A	Motor alignment tool

*It is recommended that recording heads be returned to a Crescent distributor for identification, to insure proper replacement. This is necessary because of the different compensation circuits which must be employed for each individual manufacturer's head.

When ordering parts that have an enamel finish, the color should be specified, to insure proper replacement.

**Reference numbers 60, 61, and 62 are not used on some machines.